

FIFTH ANNUAL REPORT

1960



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ONTARIO WATER RESOURCES COMMISSION
801 Bay Street
Toronto



COMMISSIONERS:

A. M. SNIDER, CHAIRMAN
W. D. CONKLIN, Q.C.
C. S. MACNAUGHTON, M.P.P.
R. M. SIMPSON
JAMES A. VANCE
A. A. WISHART, Q.C.

ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET
TORONTO 5

DR. A. E. BERRY
GENERAL MANAGER
W. S. MACDONNELL
COMMISSION SECRETARY

March 20, 1961.

To the Honorable W.K. Warrender, Q.C.,
Minister of Municipal Affairs.

Sir,-- I have the honor to submit for your approval
the Fifth Annual Report of the Ontario Water Resources
Commission, made in conformity with and under provisions
of the Ontario Water Resources Commission Act.

I have the honor to be, Sir,

Your obedient servant,

A handwritten signature in cursive script, appearing to read "A. M. Snider".
Chairman.

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801 BAY STREET
TORONTO 5

DR. A. E. BERRY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

March 16, 1961.

A. M. Snider, Esq.,
Chairman,
Ontario Water Resources Commission,
801 Bay Street,
Toronto 5, Ontario.

Dear Sir:

It is with pleasure that I present to you
and the other Commissioners of the Ontario Water
Resources Commission this, the Fifth Annual Report
of the Commission.

Yours sincerely,

A handwritten signature in cursive script, appearing to read "A. E. Berry".

General Manager and
Chief Engineer.



FIFTH
ANNUAL REPORT

1960

Ontario Water Resources Commission
801 Bay Street
Toronto

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INTRODUCTION

by

Dr. A.E. Berry
General Manager and Chief Engineer

It is a pleasure, in this Fifth Annual Report of the Ontario Water Resources Commission to record the progress made during the year and to review the activities carried on. The program embraced widespread activities. Construction was increased and more projects were brought into operation. Surveys for water supplies and pollution abatement were extended. Services were made available to municipalities, industry and the public and numerous problems were solved.

New problems continued to arise during the year as the program extended and the need for more activities became apparent. An effort was made to meet these requirements through provision of additional staff and facilities. Two important changes in facilities took place. The new laboratory and research building came into service in the early months, and the remainder of the staff were housed together before the close of the year in the new building at 801 Bay Street, Toronto. These new facilities did help and will continue to aid materially in the work of the Commission. The housing of the staff, other than those of the laboratory, in the same building with the Minister and staff of the Department of Municipal Affairs facilitated a close liaison among those dealing directly with municipal administrative problems.

Particular emphasis was placed during the year on pollution abatement and the conservation of the water resources of the province. Surveys, chiefly on a county basis, were increased in order to detect the sources and kinds of pollution. Since the Commission came into existence, 80 sewage treatment plants have been built to serve a population of one million, and 17 more were under construction to serve another 450,000 population. Public attention was also directed to the need for concerted efforts in this field when a co-ordinated water pollution control conference was held in Toronto, November 29-30. A new award was established by the Commission to be known as "The Distinguished Service Award" to recognize those who had contributed much to this work. Three recipients were honored at the conference in the persons of Robert J. Hull, president of Cities Service Oil Company, Limited, for services in the industrial field, F. H. Kortright of Toronto for individual services in the promotion of conservation, and R. E. Mountain, former mayor of Stratford, for services in the municipal field.

Changes in the Commission

There was a change in the personnel of the Commission during the year. The Honorable John P. Robarts, Q.C., M.P.P., London, had resigned in December, 1959, to become Minister of Education. This position was filled with the appointment of Charles S. MacNaughton, M.P.P., Exeter, Ontario, on January 21st.

The Commission at the end of the year consisted of the follow-

ing: A.M. Snider, Waterloo, chairman; commissioners, W.D. Conklin, Q.C., Kingsville, Charles S. MacNaughton, M.P.P., Exeter, R. M. Simpson, Arnprior, Dr. J.A. Vance, Woodstock, and A.A. Wishart, Q.C., Sault Ste. Marie.

The Commission operates under the Ontario Water Resources Commission Act, 1957, and Amendments thereto. Further amendments were made in 1960; these came into effect on April 12th. These amendments were intended to facilitate the work of the Commission and were related chiefly to the use of analysts' certificates in prosecutions, requirements for industrial and commercial enterprises in respect to waste disposal and making OWRC projects subject to municipal property tax. A new form of bonding on Commission projects and the adoption of public tender openings were part of the year's program. Amendments were made to regulations on water wells and on plumbing.

Organization of the Commission

No major changes were made during the year in the organization of the Commission's personnel and activities. In addition to the main administrative branch there are five divisions, namely, Construction, Plant Operations, Laboratories and Research, Sanitary Engineering and Water Resources.

A director has charge of a division with supervisors in charge of various branches reporting through the directors. The staff of the Commission, outside plants under its jurisdiction, at the end of the year totalled 214 of which 115 were professional and technical and 10 mechanical. The total number on this headquarters and laboratory staff the previous year was 167. In addition, the Commission through the Division of Plant Operations was responsible for 92 water and sewage plant operators. This number had risen from 22 the previous year. It was with regret that the resignations of a number of senior personnel were accepted during the year. They included Brian Larmour, secretary of the Commission since its inception, N.A. Shepherd, solicitor, and W. M. Ross, comptroller.



OWRC New Home in Toronto

The organization at the year-end consisted of the following:

Administration

General Manager and Chief Engineer -- Dr. A. E. Berry
Commission Secretary -- W. S. MacDonnell
Solicitor -- H. S. Landis
Information Officer -- John C. Scott
Accountant -- D. A. Joynt
Personnel Officer -- A. R. W. Uren
Project Officer -- Frank J. Campbell

Division of Construction

Director -- Allan W. Shattuck
Supervisor, J. C. F. MacDonald

Division of Laboratories and Research

Director -- F. A. Voegel

Supervisor, Industrial Wastes -- F. A. Voegel

Supervisor, Chemical Laboratory -- C. E. Simpson

Supervisor, Purification Processes -- J. G. Duncan

Bacteriologist -- L. T. Vlassoff

Biologist -- J. H. Neil

Division of Plant Operations

Director -- D. S. Caverly

Supervisor, Water Works - C. W. Perry

Supervisor, Sewage Works - B. Palmer

Division of Sanitary Engineering

Director -- G. M. Galimbert

Supervisor, Field Activities - E. W. Johnston

Supervisor, Stream Sanitation -- O. V. Ball

Supervisor, Sewage Works -- L. E. Owers

Supervisor, Water Works -- K. H. Sharpe

Division of Water Resources

Supervisor, Ground Water -- A. K. Watt

Supervisor, Surface Water -- K. E. Symons

Summary of Significant Activities

The report of each division contains a review of the main features of the program carried on during the year. An analysis of these activities will reveal the progress and the scope of the work carried on during that period.

Certificates for Water and Sewage Works

The legislation requires the approval of the Commission for the installation or extension of all public water and sewage projects in the province. The number of certificates issued and the estimated expenditures for these works are accordingly an index of the programs being carried on in the various municipalities. During 1960 the total number of certificates issued reached 1,695, in comparison with 1,975 certificates issued the previous year. The estimated expenditure for these works was \$111,037,642.58. This was a decrease from the previous year's total of \$115,726,003.00. This decrease occurred principally in the latter part of the year when these activities slowed down. The 1959 figures were the highest since the Commission was established.

The following summary contains estimated expenditures for these works--

<u>Water Works:</u>	<u>Estimated Cost</u>
Extensions to existing systems.....	\$20,804,807.54
Purification of water supplies.....	\$ 7,313,938.52
New systems.....	\$ 1,773,331.69
Total.....	<u>\$29,892,077.75</u>
<u>Sewage Works:</u>	
Extensions to existing systems.....	\$68,007,024.78
Treatment works.....	\$11,130,766.21
New systems.....	\$ 2,007,773.84
Total.....	<u>\$81,145,564.83</u>
Grand Total All Works	\$111,037,642.58

The nature of these works and the municipality in which they were carried out are listed in the report of the Sanitary Engineering Division.

The Commission undertakes through agreements to carry out work for municipalities in water supply and purification, trunk sewers and sewage treatment. In some of the smaller municipalities the local water mains and lateral sewers were also included. During the year 124 certificates were required for OWRC projects amounting to a total of \$16,068,113.74. These figures compare with 117 certificates and an expenditure of \$16,274,984.94 for the previous year. The 1960 certificates for OWRC projects included 56 for water works at a total estimated cost of \$4,023,097.86 and 68 certificates for sewage works at a total cost of \$12,045,016.08. The preponderance of work in the sewerage field continued to be apparent.

Construction Program

The construction programs of the Commission are based on agreements with municipalities. The facilities of the Commission are available for this when the municipalities so desire. The policy under these circumstances is for the Commission to take responsibility for the design, construction, financing and operation of the works embodied in these agreements. The estimated expenditures for OWRC projects rose during the year from \$40,894,294.00 to \$55,715,616.00. The details of the various projects since the Commission undertook this work are shown in the following tabulation. Thus it will be seen that at the end of 1960 there were 142 projects either completed, under construction, or under agreement. Of these, 68 were water and 78 were sewage projects. These involved 114 municipalities.

OWRC Projects are listed by the Project Control section as Completed, Under Construction or Under Agreement as at December 31, 1960:

<u>Water Works</u>		<u>Sewage Works</u>	
	Actual or Estimated Cost		Actual or Estimated Cost
\$		\$	
xAlfred	133,344	xBancroft	105,179
xAncaster	193,154	xBarrie	270,760
xBancroft	240,290	Bracebridge	310,200
xBath	31,488	Bradford	213,000
yBeaverton	10,000	xBrampton/	1,360,000
xBelle River	55,648	Chinguacousy	
yBertie	654,745	Brampton (S2)	184,700
yBlind River	31,500	xBrantford	2,207,267
xBolton	62,251	xBurlington	380,172
yBracebridge Area	70,355	yBurlington (S2)	720,050
yBrampton	266,500	yChelmsford	175,000
xBrock Twp.	98,558	xConiston	472,784
(Sunderland)		Coniston (S2)	30,000
Caledon East	75,000	Cornwall	175,000
Campbellford	135,000	xFergus	260,000
tdCannington	4,000	Fort Frances	969,000
xChesterville	296,300	Fort William	1,370,000
tdClarke Twp.	7,500	xFrankford	163,344
(Orono)		xGalt	248,966
tdCookstown	5,000	yGalt (S2)	143,113
xDresden	170,829	yGeorgetown	825,570
xDresden (W2)	18,082	yGrimsby	159,492
xDundas	341,866	xHespeler	21,574
xDunnville Area	2,517,043	xHuntsville	440,844
yElmvale	64,000	Kenora	88,100
xEssex County	3,854,494	xKitchener	1,322,596
(Union)		(Stage 1)	
xEssex Town	86,383	Kitchener	762,900
(Standpipe)		(Stage 2)	
Fenelon Falls	295,000	xKorah Twp.	44,309
Ferris West	42,452	xKorah Twp. (S3)	112,680
xFrankford	119,313	Korah Twp. (S4)	205,000
yGalt	256,855	xLeamington	85,855
tdGrand Bend	12,000	yLeamington (S2)	69,263
xHarrow	500,439	xListowel	328,184
Hastings	139,100	Listowel (S2)	56,060
xHavelock	177,282	xLondon Twp.	897,130
xHespeler	16,365	xMarkham Village	567,100
xHuntsville	87,850	Markham Village (S2)	191,000
Kenora	99,070	Marmora	30,460
tdKing Twp.	15,000	Mitchell	237,975
xKitchener	288,370	(Sanitary)	
xLeamington (W2)	22,234	xMitchell (Storm)	52,963
tdMcGregor Area	8,000	yNeelon & Garson	890,947
xMaidstone	217,239	yNepean Twp.	1,261,820
xMarkham Twp.	486,259	New Hamburg	220,000

Water Works (Cont.)

	Actual or Estimated Cost
\$	
xMarkham Village	46,744
yMarmora	183,700
xMeaford	478,879
xMidland	46,448
yMitchell	107,241
yNewcastle	170,355
xOrangeville	72,500
yParkhill	142,500
Playfair Twp. (Ramore)	33,445
tdPort Burwell	10,000
xPort Perry	62,421
xPreston	265,910
Ratter & Dunnet (Warren)	58,168
xRichmond Hill	218,457
ySault Ste. Marie	93,000
Sault Ste. Marie (W2)	115,000
xStayner	60,272
tdTara	5,000
yThedford	179,800
xTrafalgar Twp. Val Albert	211,766
tdVankleek Hill	227,075
tdWaterdown	15,000
tdWellington	10,000
yWhitby Twp. (Brooklin)	7,000
xWinchester	234,700
	269,516

Sewage Works (Cont.)

	Actual or Estimated Cost
\$	
xNorth Bay Area	2,175,530
xOrangeville	165,860
Owen Sound (Storm)	684,380
Owen Sound (Sanitary)	1,350,000
Paris	1,300,000
Playfair Twp. (Ramore)	34,720
yPoint Edward	813,594
xPort Arthur	2,168,791
yPort Colborne	626,100
Port Colborne (S2)	154,800
yPreston	862,200
xRichmond Hill	359,525
ySault Ste. Marie Area	3,267,000
Seaforth	105,200
Shelburne	183,435
xStirling	240,600
xStratford	925,309
xStratford (S2)	84,901
xStreetsville	310,938
ySudbury	522,900
Sudbury (S2)	50,000
yTarentorus (S2)	118,163
yTillsonburg	587,767
Timmins	22,000
xToronto Twp.	500,749
yToronto Twp. Metro	2,022,000
xTrafalgar Twp.	257,673
xTrenton	515,937
xWaterloo	670,000
xWestminster Twp.	253,230
xWiarton	123,902
yWinchester	96,500

Water Works Total \$ 15,531,055

Sewage Works Total \$ 40,184,067

GRAND TOTAL - WATER WORKS AND SEWAGE WORKS \$55,715,116

x - in operation y - under construction td - test drilling

Toward the end of the year new legislation at federal level came into effect. This altered the procedure considerably in that Central Mortgage and Housing Corporation was authorized to lend money for certain parts of sewage works programs and to forgive 25 per cent of this loan on such work completed prior to March 31st, 1963. This offer was accepted as substantial assistance to municipalities required to put in sewage treatment plants and trunk sewers. The Commission joined actively with the federal government in furthering these works and offered to finance that part of the trunk sewers and sewage treatment plants which would not be included in the loan from the federal government. A number of details had to be worked out and this temporarily slowed down these projects towards the end of the year. It was expected that there would be considerable acceleration in such work during the next two years.

The report of the Construction Division sets out information on the status of each project during the year. It will be seen that these projects involve both large and small works with particular emphasis being placed on the systems to the small and medium-size communities. The heavy expenditure on sewage works in comparison with water works shows an attempt to catch up in these needs and to correct conditions apparent for some time. At the end of the year there was gratifying progress in respect to works to be undertaken, both to satisfy water needs and sewage needs of communities.

The policy of the Commission was continued through the year in assuming responsibility for the operation of each of the projects it constructed. This insured for the municipalities the technical skill and assistance necessary in supervising the operation of these plants as well as laboratory facilities. This was particularly beneficial in the operation of sewage works, the efficiency of which is related to the results to be obtained in pollution control.

The Division of Plant Operations was, at the end of the year, in charge of 32 water projects and 33 sewage works, an increase of 31 during the year. The operating staff for these projects at the end of the year numbered 92. The capital cost of the works in operation at the close of the year was \$32,807,000, and the total operating cost for the projects for the year was \$586,452.94. Information on these various projects is found in the report of the director of this division.

Reference might be made again to the close liaison with the local advisory committees. These committees, appointed by the municipality, and consisting usually of five or six persons, are kept closely in touch with project affairs by the staff of the Commission, particularly in respect to appointment of staff, salaries and major expenditures involved in operation. In this way full advantage is taken of the technical services of the Commission along with direction of the local municipal personnel.

Sanitary Engineering Activities

It is the responsibility of the Sanitary Engineering Division

of the Commission to supervise water works, sewage works, stream pollution and all related matters. Details of these activities are included in the report of the director of that division. Some of the more significant items include the following:

(a) Water Works - The number of municipal water works systems in operation at the end of the year was 450. These served 4,500,000 persons or approximately 72 per cent of the population of the province. Close contact was maintained with these systems during the year by the district engineering staff of the Commission. The staff made 243 inspections of water purification plants as well as 200 inspections of water works systems in general. These latter included municipal, industrial, institutional and private supplies. Samples to the number of 930 were taken for bacteriological analyses and 704 for chemical determinations.

(b) Sewage Works - The extension of sewers and the construction of sewage treatment facilities continued at a rapid pace. At the close of the year the number of treatment plants in operation totalled 250, serving more than 4,000,000 persons, approximately 66 per cent of the population of the province.

The district engineering staff made 346 inspections of treatment plants during the year. These were divided into 209 municipal, 37 industrial, 24 military, 27 institutional and 49 private plants. In addition to these there were 188 inspections of sewerage works, 488 organic industrial waste plants and 55 drainage inspections. These involved the collection of 720 samples for bacteriological testing, 1,928 for chemical tests and 25 for special tests.

At the end of the year there was a forward movement in the various municipalities towards the construction of needed sewage treatment plants and enlargement or modification of existing ones. While these programs would take some time to become fully completed, it was clear that great progress was being made towards the protection of the water resources of the province against the contaminating effects of domestic sewage and industrial waste of all kinds.

(c) Industrial Wastes - Industrial wastes must be given treatment to coincide with that given for domestic sewage. Many of these wastes are discharged to the municipal sewers and the treatment takes place at the municipal plant. In other instances, the industry must assume responsibility for its own treatment facilities. Where it is feasible to join the industrial waste with the municipal sewage, this is recommended, but many industries have wastes which are either too great in volume or of a type which make it difficult to have treatment carried out by the municipality. Wherever an industrial waste is to be discharged directly to a stream, the standards for treatment are prescribed by the Commission and it is expected that the industry concerned will insure that the treatment is such that the effluent will not have an injurious effect on the receiving watercourse. Some of the most troublesome wastes to treat during the year consisted of those coming from canneries, milk plants, oil refineries, tanneries, plating works, pulp and paper mills and chemical industries. Good progress was noted during 1960, however, in meeting these industrial waste problems.

(d) Stream Sanitation - Much emphasis was placed on the inventories of the water quality in streams and the types of wastes going into these streams. The first part of this problem is a recognition and a knowledge of its nature and extent. During the year 45 complete stream surveys and 10 partial surveys were made. This involved a collection of samples of chemical and bacteriological analyses at 1,408 sampling points. Pollution investigations to the extent of 218 were made at various locations on streams and lakes. This work was increased substantially over the previous year.

Two problems are encountered continuously in dealing with stream sanitation. One is the use of storm drains where no sanitary sewers exist and where the municipalities permit sanitary wastes to get into the storm mains, thereby causing objectionable pollution. The other is the discharge through certain unreported outfalls of objectionable wastes instead of having these discharged into the sanitary sewers. It is recognized that if these streams are to be protected adequately, these various outfalls and connections to storm drains must be excluded. It is necessary to make detailed surveys in order to detect these conditions and to assist the municipalities and the individuals in bringing about corrective measures. Where these surveys are made on a county basis, each municipality and offending person is notified of the conditions found and that a change is to be expected. One of the first of the surveys of this nature was carried on in Oxford County where at the end of the year nearly all sources of pollution had been collected and steps taken to bring about full correction.

(e) Activities in the Districts - The work of the district engineering staff is important in the supervision of all water and sewage plants as well as stream sanitation. The division of the province into four districts, each with a supervisor and additional staff, is directed towards meeting these requirements. Special staff is needed for this purpose and while it has been difficult in the past to obtain sufficient numbers this requirement is gradually being met. An important part of the work of the district staff involves meetings with municipal and other officials. During 1960 it was recorded there were 1,072 meetings; 67 of which were with municipal councils, 223 with municipal clerks, 234 with other municipal officials, 129 with public utility commissions, 61 with consulting engineers, 188 with medical officers of health and 170 with other personnel.

(f) Sub-division Plans - The review of all sub-division plans submitted by the Community Planning Branch of the Department of Municipal Affairs continued throughout the year. In this way the Commission gives technical and other advice on these applications. During the year there was a review of plans for 830 subdivisions. This figure was lower than the previous year but about the same as in the year 1958. The need for close supervision over the development of sub-divisions is apparent, especially in respect to water and sewage needs.

(g) Plumbing Regulations - During the year amended plumbing regulations came into effect and there was a complete transfer of

the administration of these from the Ontario Department of Health to the OWRC. The inspection work is carried out by the municipalities to conform with the requirements of the regulations.

Water Resources Activities

The Division of Water Resources consists of two branches, one dealing with ground water and the other with surface water.

(a) Ground Water Branch - The work of this branch during the year was divided chiefly into three categories--ground water surveys; licencing of drilling contractors and the checking of field activities related thereto and an observation well program designed to assist municipalities and others interested in obtaining ground water.

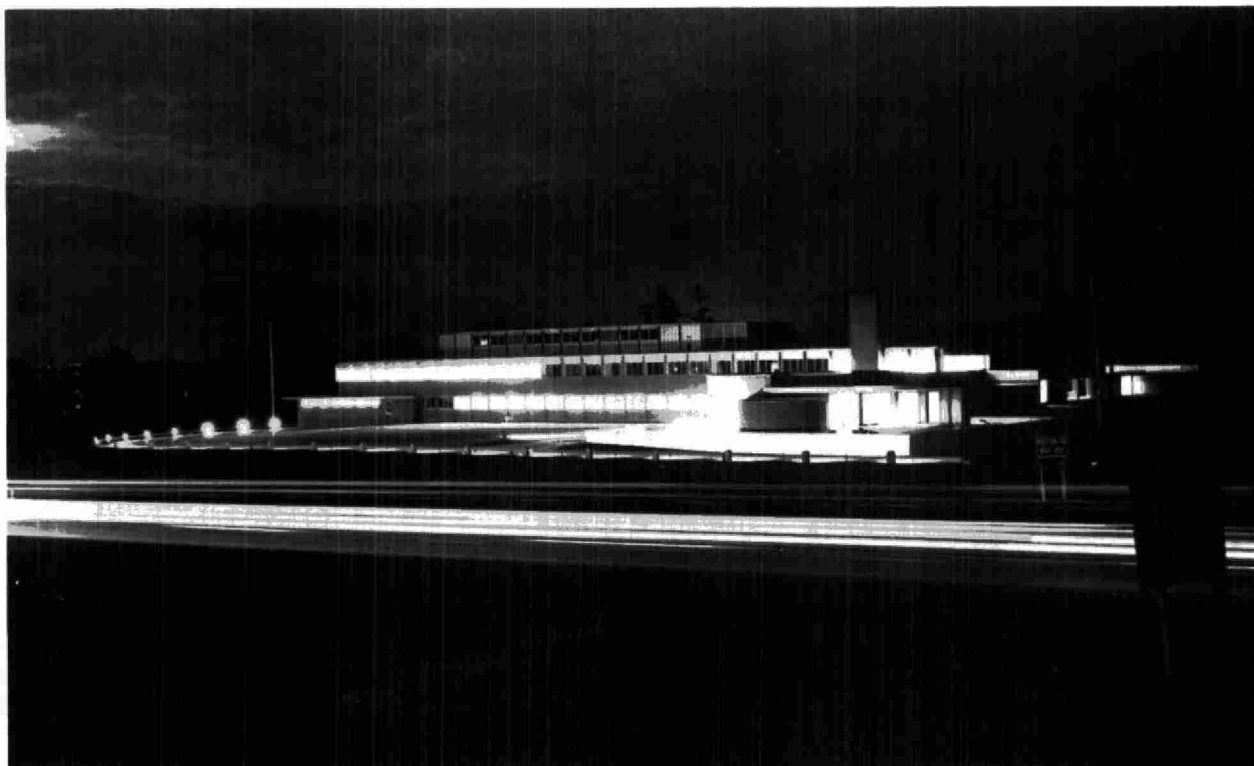
During the year records for 7,457 wells were filed with the Branch, this number being slightly less than the previous year. Licencing during the year of 400 drilling contractors was carried out in accordance with the regulations.

The Ground Water Branch obtained success in providing information and assistance to municipalities and others interested in developing ground water supplies. Numerous requests were received for these services and on OWRC projects involving ground water the branch played a major part in locating and developing the water. Much of the effort of the branch was also employed in the surveys of counties for water resources and pollution control. At the end of the year, 27 observation wells were in use. Five wells were abandoned during the year when they became unsuitable for this purpose. Automatic recorders were in use in 11 wells, all of which gave information on ground water conditions. Toward the end of the year, a pronounced shortage in ground water was apparent in many places throughout the province. The low rainfall added greatly to this difficulty and the Commission was actively studying methods which might be used to assist in the development and utilization of ground water to the maximum extent.

(b) Surface Water Branch - This branch focused its attention on the intensified county surveys undertaken by the Commission. The counties and districts studied included Carleton, Peel, Waterloo, Wentworth and Sudbury, as well as a continued investigation of Haldimand County. These reports will serve as the basis for programs to be developed to insure an adequate quantity of water and to protect water courses against pollution. Much of the field work has to be carried on during the summer and it is time-consuming.

The field participation of staff assigned to the Surface Water Branch in county surveys totalled 273 days when 1,260 water and wastewater samples were taken.

Low flow analysis was initiated at specific locations on the Grand and Thames rivers. Findings would be applicable to the assessment of sanitary uses of these waters.



Laboratories and Research

New OWRC Laboratory at Night

The Laboratories Division plays an essential part in the entire work of the Commission. It is responsible for the examination of samples submitted by the field staff of the various branches and it plays an important role in supervision over water, sewage and industrial waste processes. The temporary laboratory facilities at 46 Wellesley Street were abandoned and the staff moved on March 28th to the new and modern laboratory building on Highway 401 and Islington Avenue. Here the facilities and the personnel will provide a great assistance in the program of the Commission. There are also facilities for carrying on research, an activity which is becoming more widely recognized from time to time. This new building is also equipped with a lecture hall and with training facilities for plant operators and where conferences on various subjects can be held.

The work of the laboratory is organized under different branches--bacteriological, chemical, biological, industrial wastes and purification processes.

The great increase in the number of samples analyzed is seen in the year 1960 when the total number reached 29,296, as compared with a total of 5,915 in 1956 when the Commission was established. These figures have risen consistently each year and it is expected that they will go considerably higher.

The Bacteriological Branch showed an increase in the number of samples from 2,632 in 1956 to 11,214 in 1960. The relationship between the samples of 1959 and 1960 is shown in an accompanying graph.

A similar situation prevailed in the Chemistry Branch of the Laboratory where in 1960 the samples reached a total of 17,732 as against 3,263 in 1956. There was an increase of 3,655 over the

year 1959. This information is portrayed in the graphs accompanying the report of the Laboratories Division. Even more significant are the figures on the number of individual determinations made in the chemical laboratory on these samples. In 1960 this rose to 85,529 as compared with 29,365 in 1957. It is estimated that this will go considerably higher in the following year.

The Industrial Waste Branch has an important role to play in investigation of industrial waste in the various places throughout the province. This is important not only to detect possible sources of pollution but also to secure information where sewage works are to be designed or to determine the possible effects of these wastes on sewage treatment processes. This branch combined in the county water resources surveys involving an investigation of 115 industries. As the province becomes more industrialized and new products come on the market the importance of assessing these and their effects on receiving waters becomes ever more apparent. A continuing effort is essential to obtain full information on these problems and to offset the effects of the many changes taking place in the processes.

The Purification Processes Branch continued its investigation of processes of a special nature to determine the efficiency of these and their utilization. Experimental work was continued and field observations were made. In one instance, a municipal water supply which had adversely been affected by an industrial waste was successfully investigated by the use of fluorescein dye to detect the flow of this waste underground.

In the Biology Branch two major field studies were carried out, one being a survey for the International Joint Commission and the other studies relating to the control of algae in surface waters. The latter problem has become an intense one and nuisances result where this material washes up close to shore and decomposes. Chemical treatment of algae has been under investigation with encouraging results. It is hoped to continue these studies in the field and to expand them wherever necessary.

Public Information

The activities of the Information Branch were continued throughout the year in an effort to make needed information available to municipalities and to the public. An exhibit was placed at the Canadian National Exhibition in Toronto; a new and attractive booklet on laboratory services was made available for the formal opening of this building in the fall. The conference on Co-ordinated Pollution Control was recorded and published in booklet form for wide distribution as an aid in furthering this activity.

Legal Branch

In addition to the amendments to the OWRC Act, regulations were developed as an amendment to those on water wells and new regulations were put in force on plumbing. There was also a major change in the procedure for making tenders and for the bonding of OWRC projects.

Property Acquisition

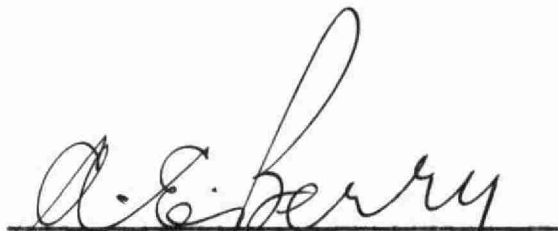
In the acquisition of property and easements needed for OWRC projects, the work was augmented but considerable progress was made during the year in developing a procedure most effective for this purpose. A brief on this was submitted to the standing committee of the legislature dealing with expropriation. Most of the property needed is acquired by negotiation but in some instances expropriation has been necessary in order to overcome local circumstances and to expedite the program.

Accounting Activities

The work of the accounting branch increased during the year as more projects were undertaken and greater activity centered around plant operations. The capital expenditures for the fiscal year 1957-58 rose from \$1,787,000 to \$15,550,000 in 1960-61.

The Staff of the Commission

Sincere appreciation and thanks are extended to the members of the Commission and the staff for their co-operation during the year. In this rapidly expanding program it is essential to have an efficient and loyal staff. The Commission can feel satisfied that this is the situation and that these activities can be dealt with efficiency and with confidence in the future.


A. E. Berry,
General Manager and
Chief Engineer.

ADMINISTRATIVE BRANCHES

Activities of the Administrative branches of the Commission are recorded herewith:

Accounts Branch

During 1960 the volume of work in the Accounts Branch increased in line with the rapid expansion of the activities of the Commission. This increased activity was reflected directly by increase in the branch staff and conversion of manual records to machines.

Commission growth emphasized by these figures:

a) Expenditures in the operation of water and sewage plants:

1958	\$ 27,347
1959	\$ 155,787
1960	\$ 586,453

b) Staff on Payroll:

	<u>Plant Operators</u>	<u>OWRC Staff</u>
1959	22	167
1960	92	214

c) Capital Expenditure:

1957-58	\$ 1,787,000
1958-59	\$ 9,227,000
1959-60	\$13,309,000
1960-61	\$15,550,000 (estimated)

d) Ordinary Vote Expenditure:

1956-57	\$ 34,056
1957-58	\$ 518,060
1958-59	\$ 951,811
1959-60	\$ 1,260,021
1960-61	\$ 1,600,000 (estimated)

In addition to the routine accounting activities, the Accounts Branch was responsible for a presentation to each municipal council involved in an OWRC project of a summary of expenditures in the construction of the project, as well as the first billing by the OWRC. Attendance at meetings of the council for this purpose has proved most important as all questions about the cost and the billings are cleared up at such times.

Eleven municipalities which financed projects through the OWRC have taken advantage of the assistance provided by the Accounts Branch in the setting up and maintaining of accounting records. Trips are planned for approximately every three months for this purpose. At present the following municipalities are being assisted.

Village of Winchester, Village of Alfred, Village of Havelock, Village of Frankford, Village of Bancroft, Town of Harrow, Town of Essex, Township of Mersea, Township of Gosfield North, Township of Gosfield South and Township of Maidstone.

Information Branch

First and foremost among the numerous activities of the Information Branch throughout 1960 was the dissemination of information to the public concerning the Commission and its work.

This information was handled in a number of ways--news releases to press, radio and trade and other publications; the distribution of literature; the preparation of speech material for use by Commission members and staff as well as for other government representatives; preparation of feature-type material for various publications; exhibits and advertising.

Feature news releases during the year concerned the OWRC clean-up of the Credit river, the value of the winter work subsidy in relation to OWRC projects, action taken by the Commission to check stream pollution by milk wastes in Oxford County, the report on the 1959 investigations into the nature and control of excessive algae Cladophora in Lake Ontario, plans for further OWRC survey programs and the intention of the OWRC to co-operate wherever possible in new federal plans to aid sewerage projects.

As usual all construction contract awards were announced via the news release service, while official openings of completed OWRC water and sewage projects were well publicized along with the Commission's first course for water works operators and the opening of the new OWRC laboratory and research building on Highway 401 in northwest Metro Toronto.

The resignation of Brian Larmour, the Commission's first secretary, and the subsequent appointment of W.S. MacDonnell to that position also were featured in news releases.

The OWRC picture service was active, particularly in regard to official openings of Commission-built and owned plants. There was a fairly steady demand for pictures throughout the year. In addition, a file of individual staff pictures was started.

In the field of publications, the Information Office continued publishing the monthly OWRC News, staff publication, introducing pictures in it for the first time. One new major publication--an attractive booklet concerning OWRC laboratory activities--was prepared and published.

The usual one-shot annual display advertising campaign was organized, and the office continued to handle all tender call advertising throughout the year.

The OWRC exhibit in the Ontario Government Building at the Canadian National Exhibition once again was the responsibility of the Information Office. It was the most attractive show so far and

attracted a lot of attention and favorable comment. Displays also were arranged for the soil conservation conference at Guelph and an industrial fair at Newmarket.

In addition, the Information Office ordered plaques for OWRC projects in operation where and when needed, organized the Commission campaign on behalf of the Metro Toronto United Appeal, co-operated with the principals in organizing the first annual Co-ordinated Water Pollution Control Conference and organized the publicity and picture service for the annual Industrial Waste Conference.

Legal Branch

The Legal Branch had a busy and fruitful year despite the resignation of the Supervisor of Legal Services and the separation of the Property Section from the Legal Branch.

The Regulations for water wells and the Plumbing Regulations were revised. The transfer of jurisdiction over plumbing from the Public Health Act to the Ontario Water Resources Commission Act created many problems of inspection and control and it was expected that further legislative amendments would be necessary.

There were three chief legislative amendments during the year to the Ontario Water Resources Commission Act:

- (i) A certificate or report of an analyst of the Commission as to the analysis, quality or ingredients of any water or of any material was made prima facie evidence of the facts stated in the certificate.
- (ii) The Commission, with the approval of the Minister, was authorized to require industrial or commercial enterprises that do not make adequate arrangements for sewage disposal, to install or construct satisfactory sewage treatment facilities and to maintain, repair and operate them as directed by the Commission.
- (iii) The sewage and water projects constructed and operated by the Commission were made subject to municipal property taxes.

The first two amendments will be of considerable assistance in pollution control.

There was a revision of the procedure for making tenders for the construction of projects and several revisions in the forms used in connection therewith. The Commission adopted the procedure for bonding contractors used by the Department of Highways and this required revision of the form of bond and of the general conditions of the construction contract.

A complete set of forms was drawn up for the Property Branch. These have significantly speeded up the acquisition of property for projects.

An arbitration was held at Coniston in connection with the sewer project and a partial decision reasonably favorable to the Commission was obtained. Much work was done in the preparation of the Commission's complex and large case against a bond company, arising out of the bankruptcy of a contractor at Listowel, and it was expected that legal action would be taken against the company early in 1961.

After considerable research, a lecture on legal problems in the supply and treatment of water was prepared and given in the Commission's basic water works course. The subject had not previously been dealt with in Canadian legal literature in a systematic manner and it evoked considerable interest and discussion.

Property Branch

There was a marked increase in activity in the Property Branch in 1960, which was especially noticeable in the second half of the year. Approximately 40 new projects were received during the year in which real estate acquisition was necessary. Others were checked to insure that no action was required.

Early in the year standard forms of easement, options, test drilling agreements and similar forms were printed and brought into effect, and instructions to surveyors, solicitors and others were standardized. In April property purchase procedure was amended to remove extensive duplication and to streamline procedure for property acquisition. Two subsequent amendments were made, as a result of which the chairman and general manager, while retaining complete control over property acquisition, had the incidental paper work reduced by 80%. In July, a separate filing and control system was established for all legal documents connected with property, and in September the branch became responsible for local taxes levied upon Commission property due to a revision of the Assessment Act.

With the resignation of the Supervisor of Legal Services, the Property and Legal branches were separated, to become separate branches of the Administration Division.

The move to 801 Bay Street in November provided closer contact with other OWRC sections. This removed many administrative difficulties and helped speed up certain procedures. One outstanding example in this respect was an arrangement with Accounts whereby cheques for option payments were drawn on the operating account. These cheques were made available within two days of approval by the general manager, instead of the four weeks previously required to obtain cheques from the Treasury Department.

In December, with the entry of the federal government into the field, a considerable amount of time was spent in discussions attempting to reconcile the two procedures in respect of acquisition and ownership of property.

At the year's end there were a number of very early projects with incomplete real estate information. The policy during the year, however, was to concentrate on current and new projects and

to leave the old projects until sufficient time was available without detracting from current operations. Certain risks were obviously inherent in this policy but these appeared to have been more than warranted by the virtual elimination of holdups on construction during the year. Certain projects gave specific difficulties, however, notably Listowel and Brampton. It was interesting to note that both these cases concerned towns where the local council retained the maximum amount of control over property acquisition and our standard procedures were disregarded to a large extent.

An increasing number of damage claims were received during the year, and were handled in conjunction with the Construction Division. It appeared that if this trend was maintained and the number of such claims continued to rise, a more comprehensive procedure would be required for their handling.

The increase in the volume is illustrated by the fact that during the year approximately 230 properties were acquired (including 89 options which had not been taken up by the year's end). Of this number approximately two-thirds were handled in the latter half of the year. Eighteen properties were expropriated during the year, with expropriation claims being settled in only two of these cases.

Preliminary investigations of new projects in December indicated the number of properties to be acquired would continue to increase rapidly. The Property Branch kept pace with the projects as far as acquisition of property was concerned but the formalities of conveyance and transfer of title, which were handled by the local solicitor, continued to be very slow and continual pressure was required in most cases to complete all transactions.

Every effort was made during the year to avoid the necessity of expropriating property, and expropriations formed slightly less than 8% of the total. This percentage may be expected to rise in 1961 as increased volume would give correspondingly less time to spend on individual owners, especially in those cases where the owners were unreasonable. At the end of the year it was the intention to settle all outstanding expropriations by agreement or by submission to arbitration, and a tentative date was set, June 30th, for this target.

During the year Ontario Government consideration of the various expropriation procedures continued, with the possibility of a revision of Commission expropriation procedures. The effect of such possible revision in OWRC operations could not be foreseen.

CONSTRUCTION DIVISION

Allan W. Shattuck, Director

The number of projects completed during 1960 showed a marked increase over the previous year. Twenty-five sewage projects and 13 water projects were completed.

Herewith is a brief summary of each project with which the Commission was involved during the year--

Ancaster Township (58-W-26)

Description of Project:	Addition to water works system
Consulting Engineers:	MacKay & MacKay, Hamilton
Completed:	June 30, 1960
Estimated Cost:	\$193,154.00

This project consisted of the construction of foundations for and erection of a 750,000 Imperial gallon steel elevated water tank to supplement the township water supply.

Bath (59-W-40)

Description of Project:	Extension of existing water system.
Consulting Engineers:	Campbell Smith Ltd., Kingston
Completed:	June, 1960

Installation of the watermains and house services were completed during 1960. The contractor experienced considerable difficulties on the housing and commercial services due to the rock conditions.

Bertie Township (59-W-47)

Description of Project:	Water supply scheme comprising:
Contract A:	Intake from Lake Erie approximately 1,800 feet long.
Contract B:	Water treatment plant including low and high lift pumping equipment, one microstrainer and chlorination apparatus.
Contract C:	14" and 12" distribution watermain approximately 16,000 feet long.
Consulting Engineers:	Canadian British Engineering Consultants, Toronto.

Expected Completion Date: Contract A: July 15, 1961
Contract B: July 1, 1961
Contract C: February 28, 1961

Estimated Cost: \$801,913.00

Contract A: Due to inclement weather conditions and the erroneous judgment of the contractor there was some delay on this contract but it was expected to be ready in July, 1961.

Contract B: This contract was proceeding well ahead of schedule.

Contract C: Progress on this contract was very satisfactory.

Barrie (59-S-31)

Description of Project: Placing fill, pumphouse, sewer forcemain and trunk sewers.

Consulting Engineers: Foundation of Canada Engineering Corporation Ltd., Toronto.

Completed: February, 1960

Estimated Cost: \$270,760.00

Granular fill was placed in 1959 and the pumphouse and sewers were completed in 1960. The pumphouse was put into operation with some equipment difficulties. These were corrected.

Bracebridge (58-W-27; Stage II)

Description of Project: Two small reservoirs and two pumphouses.

Consulting Engineers: F. Alport, Orillia.

Completed: Virtually completed by end of 1960.

Estimated Cost: \$23,500.00

Work on the larger reservoir and pumphouse was resumed in the spring and this part of the works was completed and put into operation. The start on the smaller reservoir and pumphouse in the valley was delayed owing to wet ground conditions. By the end of the year all that remained to be done was the completion of two connections, painting and grading.

Brampton (58-S-14)

Description of Project: Sewage treatment plant (m.g.d. capacity), trunk sewers and water-main from Brampton to the treatment plant.

Consulting Engineers: Proctor and Redfern, Toronto.
Completed: January, 1960
Estimated Cost: \$1,360,000.00

The plant was put into operation on January 17th and landscaping was completed in the spring.

Brantford (58-S-11)

Description of Project: This plant has a daily capacity of 12.5 m.g.d. with a possible extension up to 25 m.g.d. Full treatment is by activated sludge process and sludge filtering.

Consulting Engineers: Proctor & Redfern, Toronto
Completed: February, 1960
Estimated Cost: \$2,300,000.00

Plant is working satisfactorily.

Burlington (58-S-28)

Description of Project: Completion and enlargement of the sewage disposal plant in Elizabeth Gardens together with the necessary outfall sewer into Lake Ontario. Capacity, 750,000 g.p.d.

Consulting Engineers: Proctor & Redfern, Toronto
Completed: August, 1960.
Estimated Cost: \$275,000.00

This project included the extension of the existing pump-house, an additional primary clarifier, aeration tanks, a secondary clarifier, blower building and office and a digester with necessary controls. The big problem here was excess noise from the blowers and connecting pipes but provision of rubber cushioning on the pipe hangers eliminated a large proportion of the noise.

Burlington (60-S-51)

Description of Project: Extension of sewerage system in Burlington by the provision of two pumping stations, sewers and forcemains and an enlargement of the Drury Lane s.t.p. from 2.5 to 5.0 m.g.d.

Consulting Engineers: J.F. MacLaren Associates, Toronto

Completed: Contract A; Lakeshore Sewer & Forcemain, November, 1960.

Contract B; Brant Hospital area sewers, forcemain and pumping station, November, 1960.

Expected Completion Date: Contract C: Enlargement of s.t.p. May, 1961.

Contract D: Pumping Station on Lakeshore Rd., April, 1961.

Estimated Cost: \$610,000.00

Under Contract A approximately 8,500 feet of sanitary sewers were constructed along Lakeshore Rd. to serve, eventually, homes along this highwat which relied on septic tanks. These sewers will discharge into the pumping station being built under Contract "D" and 8,500 lineal feet of 14" forcemain included in Contract "A" will carry the sewage to Drury Lane sewage treatment plant.

The work done under Contract "B" consisted of approximately 2,200 feet of sewers and forcemains which serve the new Brant Hospital and other new buildings in the vicinity including an apartment block. A package underground pumping station transmits the sewage into an existing sewer which eventually discharges at the Drury Lane plant.

Additional aeration tanks, two secondary clarifiers and an additional digester were being constructed under Contract "C". This enlargement also necessitated modifications and small additions to other areas of the existing plant. All concrete work was completed before the end of the year and the contract should finish on schedule.

Chelmsford (60-S-58)

Description of Project: Sanitary sewerage system composed of 13,632 feet of sewers, 20 acres two-cell lagoon, sewage lift station and forcemain 5,394 feet long, and 8,774 house services.

Consulting Engineers: R.K.Kilborn & Associates Ltd., Toronto.

Expected Completion Date: June 1, 1961

Estimated Cost: \$207,749.00

Work on this project was satisfactory and about 72% complete by the end of 1960.

Chesterville (59-W-46)

Description of Project: Water works system

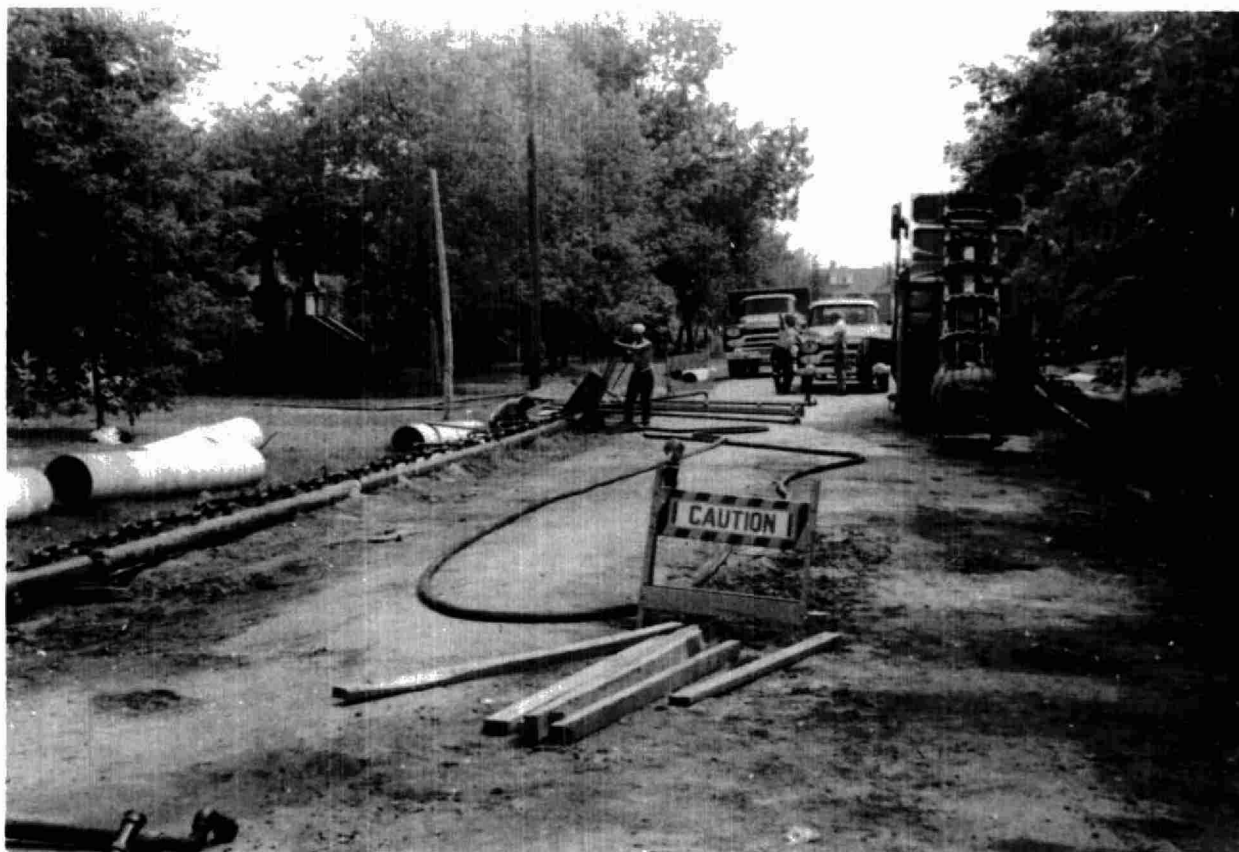
Consulting Engineers: J. L. Richards & Assoc. Ltd., Ottawa

Expected Completion Date: January, 1961

Estimated Cost: \$296,300.00

This project comprised two wells and wellhouses, a 150,000 U.S. gallon elevated steel tank and a system of distribution mains.

Work on the wellhouses and distribution system was substantially completed early in December, while work on the elevated tank was 80% complete by the end of the year.



Coniston (60-S-64)

Pipe-laying on OWRC Project

Description of Project: Sewers in Glencairn sub-division. Reconstruction of manholes. Enlargement of existing lift station.

Consulting Engineers: Lewis, Lane & Co. Ltd., Sudbury

Expected Completion Date: May, 1961

Estimated Cost: \$30,000.00

The town preferred to construct these works with its own labor forces. Work commenced on the sewers in September and was completed in November. Reconstruction of existing unsatisfactory manholes commenced in mid-December. The enlargement of Lift Station No. 3 was to be carried out in the spring of 1961.

Dunnville (58-W-17)

Description of Project:	Regional water supply scheme consisting of:
Contract A:	Intake from Lake Erie approximately 2,500 feet long.
Contract B:	Water treatment plant including low and high lift pumps, six micro-strainers and chlorination apparatus.
Contract C:	Pipelines - 20,600 feet - 36" 23,200 feet - 16"
Contract D:	Tunnel under Grand River including two shafts through which the main passes.
Consulting Engineers:	Canadian British Engineering Consultants, Toronto.
Completed:	November, 1960
Estimated Cost:	\$2,517,043.00

This project was operating satisfactorily at the year end.

Elmvale (59-W-34)

Description of Project:	Installation of a forcemain and deepwell pumphouse.
Consulting Engineers:	Proctor & Redfern, Toronto.
Expected Completion Date:	February 15, 1961
Estimated Cost:	\$55,000.00

Installation of the forcemain connection from the well to the existing watermains was completed. Several sites were tested before the final well location was established. The pumphouse was completed with the exception of the installing of the pump.

Essex Integrated Water Scheme (57-W-12)

Description of Project:	Water filtration plant serving a section of Essex County.
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Consulting Engineer: C. G. R. Armstrong, Windsor
Completed: June 1, 1960
Estimated Cost: \$3,726,855.00

This project was substantially completed by January 15, 1960, and operating satisfactorily. Minor deficiencies were corrected and the landscaping completed during the summer months.

Fergus (58-S-23)

Description of Project: Sewage treatment plant
Consulting Engineers: Proctor & Redfern, Toronto
Completed: July 1, 1960
Estimated Cost: \$265,000.00

This project consisted of the sewage treatment plant using mechanical aeration, clarifier, digesters and pumphouse. The construction and operation of the plant is satisfactory.

Galt (60-S-52)

Description of Project: 4,000 feet of sanitary sewer
Consulting Engineers: Proctor & Redfern, Toronto
Completed: August, 1960
Estimated Cost: \$151,000.00

This sewer connects one laid under OWRC Project No. 59-S-30 to a point in the vicinity of the treatment plant. Construction necessitated the crossing of Highway No. 24 twice but the work was carried out on schedule.

Galt (60-W-63)

Description of Project: 2,500,000 Imperial gallon reservoir
Consulting Engineers: J.F. MacLaren Associates, Toronto
Completed: December, 1960
Estimated Cost: \$178,000.00

This reservoir consists of two interconnecting sections, constructed in reinforced concrete with flat slab roof covered with earth. Some cracks appeared in the floor when it was under test but these were satisfactorily repaired. Water from an existing well is used to fill the reservoir and its main purpose is to augment existing storage facilities at peak demand period.

Georgetown (58-S-17)

Description of Project: Contract A: Sanitary trunk sewer along the valley of the west branch of the Credit River from the existing plant to the site of the new sewage treatment plant.

Contract B: Sewage treatment plant, activated sludge 1.5 m.g.d.

Consulting Engineers: Proctor & Redfern, Toronto

Completed: Contract A: Completed - January, 1960.

Expected Completion Date: Contract B: February, 1961

Estimated Cost: \$825,570.00

The completion of the sewage treatment plant suffered a delay due to difficulties in land ownership and also due to the delay of the manufacturer of the electric motors for the lift pump. The work executed by the contractor was very satisfactory.

Grimsby (60-S-61)

Description of Project: Extension to sanitary sewers

Consulting Engineers: J. F. MacLaren Associates, Toronto

Expected Completion Date: June 30, 1961

Estimated Cost: \$159,492.00

This project consisted of the installation of a 24" diameter trunk sewer to augment the existing sewage collection system.

Hespeler (59-S-37; 59-W-33)

Description of Project: Additions to water works system and sanitary sewers on two streets.

Consulting Engineers: Proctor & Redfern, Toronto.

Completed: April 18, 1960

Estimated Cost: \$31,938.00

This project consisted of the addition of watermains and sewer mains to the existing services.

Huntsville (58-W-19)

Description of Project: Lake intake, low lift pumping station, pumping main, and pipework

alterations in existing filtration building.

Consulting Engineers: R. V. Anderson & Associates, Ltd., Toronto.

Completed: December, 1960

Estimated Cost: \$90,000.00

The contracting firm's progress was slow and finally it went into bankruptcy in March. It was then arranged that the Huntsville Public Utilities Commission would complete the works. Testing of the raw water pumping main revealed two serious leaks which proved costly to repair. Progress remained slow but eventually the new low lift pumphouse was put into operation in December. The holdback monies were sufficient to enable the works to be completed without having to enter a claim against the bond company.

Huntsville (58-S-15)

Description of Project: Contract A: Sanitary sewers, forcemains and services.

Contract B: Sewage treatment plant and three lift stations.

Consulting Engineers: R. V. Anderson & Associates, Ltd., Toronto.

Completed: Contract A: February, 1960
Contract B: November, 1959

Estimated Cost: \$447,000.00

The installation of house sewer services was completed in early February. The condition of Main Street and some side streets gave rise to concern until in June when the whole of Main Street was paved by the Department of Highways. A sanitary sewer and services were laid on Centre Street in May as an extra to the contract at the request of the town.

Kitchener (58-S-19)

Description of Project: Sewage treatment plant.

Consulting Engineers: Proctor & Redfern, Toronto.

Completed: September 1, 1960

Estimated Cost: \$889,030.39

This project described as Stage #1 consisted of extension and renovation of the existing plant by addition of two digesters, one clarifier and a filter building. Stage #1 provides

primary treatment while Stage #2 continued pending awaiting the city's approval to the proposed addition of secondary treatment.

Korah Township (59-S-42)

Description of Project: 9,000 feet of sanitary sewer
Consulting Engineers: Proctor & Redfern, Toronto
Completed: July, 1960
Estimated Cost: \$120,500.00

This project commenced in January and progressed smoothly until spring break-up when work on unpaved roads made progress impossible but the contract was completed only slightly behind schedule when ground conditions improved.

Leamington (58-S-26 - trunk sewer)
(59-S-48 (1) (2) - Sherk St. sewers)
(58-W-23 - Sherk St. watermain)

Consulting Engineers: C. G. R. Armstrong, Windsor
Completion Dates: Trunk sewer and Sherk St. sewers
Completed December, 1960
Watermain completed May, 1960
Estimated Cost: \$197,630.00

This project consisted of 6,000 feet watermain, approximately 8,000 feet trunk sewers 18" to 42" and 12,500 feet combined sewer for Sherk Street with connection to the trunk sewer to serve a newly developed area.

Listowel (58-S-25)

Description of Project: Sanitary sewers, force main and lagoons.
Consulting Engineers: Proctor & Redfern, Toronto
Completed: December 1, 1960
Estimated Cost: \$328,184.00

This project included sanitary sewers serving approximately 60% of the town, a pumping station, a force main and lagoons. The completion of this project was delayed due to the bankruptcy of one contractor.

London Township (58-S-27)

Description of Project: Contract A: North end sewage treatment plant with an initial capacity

of 2 m.g.d. activated sludge type with sludge filtering equipment.

Contract B: North end trunk sewer 33" diameter approximately 10,000 feet long.

Consulting Engineers: R. C. Dunn & Associates, London

Completion Dates: Contract A: Completed October, 1960
Contract B: Completed December, 1960

Estimated Cost: \$897,130.00

The plant was satisfactorily completed and was operating much below its capacity as the majority of houses were still not connected to the system by the end of the year.

Maidstone Township & Belle River (59-W-31)

Description of Project: Watermains

Consulting Engineers: C.G.R. Armstrong, Windsor

Completed: May 1, 1960

Estimated Cost: \$287,449.20

This project consisted of the extension of the existing water network to newly developed areas in Maidstone. The new water-mains are served from the existing Belle River filtration plant.

Markham Village (59-S-40)

Description of Project: Sewerage system including treatment plant.

Consulting Engineers: R.V. Anderson & Assoc. Ltd., Toronto

Completed: Contract A: Sewers - November, 1960
Contract B: Plant - November, 1960

Estimated Cost: \$567,100.00

This project comprised the construction of a sewerage system in the old portion of the village, a trunk sewer to the plant and a sewage treatment plant adjacent to the Rouge River to the south east of the village.

Both contracts extended approximately two months beyond the original completion date. Late delivery of equipment caused delay in placing the plant in operation and the relocation of an easement hindered the contractor from completing the last 400 feet of lateral sewers.

Markham Village (60-S-55)

Description of Project: Sanitary trunk sewer and pumping station.

Consulting Engineers: R.V. Anderson & Assoc. Ltd., Toronto

Expected Completion Date: June 10, 1961

Estimated Cost: \$271,500.00

This work comprises the construction of a sewage pumping station adjacent to the sewage treatment plant, a forcemain to the plant and 30" sewer from the pumping station following the Rouge River to Highway #48 and thence a 27" sewer, 3,360 feet west to connect with an existing sewer serving the new developments at the west end of the village.

Tenders were received in November and construction was expected to start in January, 1961.

McKim Township (59-S-41)

Description of Project: Sanitary sewers, forcemain and three pumping stations.

Consulting Engineers: Ontario Water Resources Commission

Completed: October, 1960

Estimated Cost: \$342,900.00

Work on sewers was greatly delayed due to severe winter, rains and poor management of contractor.

Marmora (58-S-25)

Description of Project: Installation of water and sewage mains, filtration plant and standpipe.

Consulting Engineers: R.V. Anderson & Associates, Toronto

Expected Completion Date: June, 1961

Estimated Cost: \$191,465.00

The installation of the watermains was completed by Armstrong Brothers Contracting Co. The Tatham Construction Company completed the filtration building and the foundation for the standpipe.

The Village of Marmora was to make application for the Federal government grant for the financing of the sewage system.

Meaford (59-W-29)

Description of Project: Contract A: Gravity intake 800 feet into Georgian Bay and construction of an intake well sub-structure.

Contract B: 5,800 feet of 16" watermain.

Contract C: Water pumping station, rapid sand filtration plant and superstructure of intake well.

Contract D: Installation of piping, electrical, filtration and control equipment.

Consulting Engineers: Philips and Roberts Ltd., Burlington.

Completed: Contracts A & B: October, 1959
Contracts C & D: December, 1960

Estimated Cost: \$430,000.00

A temporary supply of chlorinated water was delivered from February until the plant was completed in December. Progress on the structure for the filtration plant was very slow but all equipment was installed and tested in December, but due to some minor adjustment being necessary the plant was not expected to be in full operation until February, 1961. Landscaping and some outside work was to be completed in the spring of 1961.

Midland (59-W-49)

Description of Project: Addition to water works system

Consulting Engineers: R.V. Anderson & Associates, Toronto.

Completed: June 16, 1960

Estimated Cost: \$46,448.00

This project consisted of the installation of approximately 6,100 lineal feet of 10" C.I. watermain and appurtenances to the existing service.

Mitchell (59-W-42)

Description of Project: Addition to water works system

Consulting Engineers: Stages #1 and #2, Ontario Water Resources Commission
Stage #3, R.M. Dawson, Stratford;
W.O.Chisholm, Agincourt.

Completion Date
Stages #1 and #2: July 31, 1960

Estimated Cost
Stages #1, #2 and #3: \$173,216.50

Stages #1 and #2, consisting of the installation of additional watermains was completed by the local Public Utilities Commission and was in operation. Stage #3, consisting of the construction of an iron removal plant, was to be called for tender by the middle of February, 1961.

Neelon & Garson Township (60-S-65)

Description of Project: Contract A: Construction of a system of sanitary sewage laterals and service connections and a sewage lift station.

Consulting Engineer: L. Koett, Township Engineer

Expected Completion Date: October, 1961

Estimated Cost: \$306,000.00

The contract for this job was signed late in December and work was to commence in January, 1961.

Nepean Township (59-S-35)

Description of Project: Collector sewer and treatment plant.

Consulting Engineers: Collector sewer - J.A.Chalmers, Ottawa
Plant - Beaco Ltd., Toronto

Completed: Section 1 - August, 1960
Section 2 - July 19, 1960

Expected Completion Date: Section 3 - March, 1961
Plant - October 19, 1961

Estimated Cost: Sewers - \$756,320.00
Plant - \$560,000.00

This project comprises the construction of a collector sewer in starting at Merivale Road, running westerly adjacent to the Canadian National Railways' property to Bell's Corners, then across open farm land to the sewage treatment plant site on Watts Creek near Shirley's Bay, and a sewage treatment plant in the Shirley's Bay area.

There was delay in completing Section 3 of the collector sewer, due to the collapse of the sewer in three locations near the Woodroffe Avenue pumping station. The sewer was constructed at a depth of 28 feet and sandy soil with a very high water table

was encountered. Work was underway to repair this sewer.

Construction of the 1.88 m.g.d. activated sludge type sewage treatment plant got under way late in October, 1960.

Newcastle (59-W-38)

Description of Project:	Installation of watermains, stand-pipe and pumping station.
Consulting Engineers:	R. K. Kilborn & Associates Ltd., Toronto
Expected Completion Date:	April 30, 1961
Estimated Cost:	\$170,355.00

This project consists of deep well pumphouse which supplies a 150,000 gal. steel standpipe and watermains and appurtenances throughout the town.

North Bay (58-S-10)

Description of Project:	Integrated sewerage scheme including North Bay, and the Townships of West Ferris and Widdifield.
Consulting Engineers:	Graham Reid and Associates, Toronto
Completed:	Contract A: S.T.P. - September, 1960 Contract B: Sewers - North Bay, July, 1959 Contract C: Sewers - North Bay, September, 1959 Contract D: Sewers - West Ferris, December, 1960
Estimated Cost:	\$2,175,530.00

This project comprised the construction of a sewage treatment plant and trunk sewer collector system as a combined system for the municipalities of the City of North Bay and the Townships of West Ferris and Widdifield.

The sewage treatment plant was placed in operation late in September and an official opening ceremony was held in November. Adjustments to various items of equipment were necessary in the last two months of 1960.

Work on the West Ferris trunk sewer was substantially completed and the four sewage pumping stations put in operation in November. Arrangements were made between the Township of West Ferris, the Ontario Department of Highways and the OWRC for the repaving of Lakeshore Road. The repaving of Judge, Wallace, Whitney and Gertrude Avenues and Premier Road were held over until the spring of 1961.

Orangeville (58-S-16)

Description of Project: Primary sewage treatment plant.
Consulting Engineers: Proctor & Redfern, Toronto
Completed: June 20, 1960
Actual Cost: \$180,453.00

This project consisted of a pumphouse, grit removal chamber, primary clarifier, divisional chamber, chlorine contact tank, outfall sewer and the restoration of the existing plant.

Orangeville (58-W-20)

Description of Project: Additional pumping equipment installed on existing water works system.
Consulting Engineers: Proctor & Redfern, Toronto
Completed: July 28, 1960
Estimated Cost: \$72,500.00

This project consisted of the addition of a pumphouse and the enlarging of the existing pumping facilities of the reservoir.

Parkhill (59-W-45)

Description of Project: Water storage reservoir and water supply mains.
Consulting Engineers: Canadian British Engineering Consultants, Toronto.
Expected Completion Date: April, 1961
Estimated Cost: \$142,500.00

This project includes a water purification plant, a low level reservoir, a high lift pumping station and watermains to connect the plant to the existing network. The project was substantially complete at the year-end except for the installation of equipment.

Point Edward (59-S-36)

Description of Project: Sewers and primary sewage treatment plant.
Consulting Engineers: Wardell & Aitken, Islington
Expected Completion Date: July 31, 1961
Estimated Cost: \$685,494.00

The installation of the sanitary sewers was substantially complete. The primary sewerage treatment plant was approximately 50% finished.

Port Colborne (59-S-47)

Description of Project: Renovation of existing sewage treatment plant and additional primary tanks, aeration tanks, sludge digestion tank, sludge storage tank, control house, flume transmitter building and chlorination tank.

Consulting Engineers: Canadian British Engineering Consultants, Toronto

Expected Completion Date: September, 1961

Estimated Cost: \$570,000.00

Excavation was completed and the digester wall formwork was started. It was necessary to underpin the existing plant during the excavation for the new control building.

Preston (58-W-22)

Description of Project: Preliminary Contract - Development and construction of a 10-inch diameter well having a total depth of 263 feet.

Contract A: 5,000 feet of 16" feeder main.

Contract B: Deep well pumphouse and equipment.

Contract C: 1.5 million gallon storage reservoir.

Contract D: 7,500 feet of 12" watermain

Consulting Engineers: Proctor & Redfern, Toronto

Completed: Preliminary Contract - May, 1959
Contracts A & B - October, 1959
Contract C - August, 1960
Contract D - October, 1960

Estimated Cost: \$235,000.00

The storage reservoir was of pre-stressed concrete construction. This was the first structure of this type built by the Commission and there were no leaks when under test. The local Public Utilities Commission forces laid about 7,500 feet of 12" main along the future Industrial Road and this was the last stage of this project.



OWRC Water Tank Project Under Construction

Preston (59-S-46)

Description of Project: 8,200 feet of trunk sanitary sewer
Consulting Engineers: Town Engineer, Preston,
Supervision by Newton, Dickson
Associates, Toronto
Completed: August, 1960
Estimated Cost: \$145,000.00

This sewer serves part of a new industrial area in Preston as well as a number of new sub-divisions. Its construction eliminated the necessity for two existing sewage lift stations. Work was held up due to a high water table in this sandy area but the contract finished almost on schedule.

Sault Ste. Marie (60-W-64)

Description of Project: 4,000 feet of 16" watermain
Consulting Engineers: Proctor & Redfern, Toronto
Expected Completion Date: February, 1961
Estimated Cost: \$78,000.00

This watermain was being installed to give a better distribution of existing water supply. Almost the entire length was constructed along a C.P.R. right-of-way.

Sault Ste. Marie (58-S-20)

Description of Project: Integrated sewerage system for the Greater Sault Ste. Marie area including the City of Sault Ste. Marie and the Townships of Korah & Tarentorus.

Consulting Engineers: Proctor & Redfern, Toronto

Completed: Contract A: Sewer & Forcemain
December, 1960

Contract B: Sewer & Forcemain
November, 1960

Expected Completion Date: Contract C: Pim St. Pumping
Station, May, 1961

Contract D: Clark Creek Pumping
Station, May, 1961

Sewage Treatment Plant
October, 1961

Estimated Cost: \$3,089,000.00

Along Bay and Queen Streets, 28,000 feet of sewer and force-main varying in diameter from 30" to 54" were laid under Contracts A & B. These contracts were completed two months ahead of schedule. The two pumping stations under construction at the year-end were located at intermediate points along the 28,000 feet and will be automatically controlled and will pump the sewage to the sewage treatment plant located on the St. Mary's River to the East of Sault Ste. Marie. This plant will provide primary treatment using facilities for the filtration of raw sludge. Initial capacity of the plant will be 8.0 m.g.d.

Stirling (58-S-18)

Description of Project: Sewerage system, with lagoon

Consulting Engineers: Hisey & Barrington, Richmond Hill

Completed: July, 1960

Estimated Cost: \$222,267.00

This project comprised sanitary sewers in the Village of Stirling, three pumping stations and a 14 acre, two-section lagoon located to the south of the village.

The contractor completed the south section of the lagoon in the late spring and the road repaving in July, having been unable to do this work late in 1959. The pumping stations were placed in operation in March, 1960.

Settlement of the original contract was still under way at the end of the year. Only a few points remained to be resolved.

Sudbury (59-S-41) (Formerly McKim Twp.)

Description of Project: Sanitary sewage system for the Lo-Allen Development consisting of sewers and lift station.

Consulting Engineers: City Engineering Department, Sudbury

Expected Completion Date: January, 1961

Estimated Cost: \$260,000.00

This work was done by the City of Sudbury's own forces and there remained only the connection between the lift station and wet well which will be completed in January, 1961. The work was satisfactory.

Township of Tarentorus (59-S-44)

Description of Project: 9,800 feet of sanitary sewer

Consulting Engineers: Proctor & Redfern, Toronto

Completed: Substantially--November, 1960

Estimated Cost: \$118,500.00

Work on this project extended from March to November but up to the end of the year there were one of two sections which had not been accepted and the contractor was expected to return in January to clean and test these unsatisfactory sections.

Thedford (59-W-35)

Description of Project: Water supply and distribution system

Consulting Engineers: M. M. Dillon & Co., London

Expected Completion Date: April 1, 1961

Estimated Cost: \$179,800.00

This project includes the development of a well, storage reservoir, booster station, a well pumphouse and watermains to serve approximately 50% of the town's population with water.

Tillsonburg (58-S-12)

Description of Project: Contract A: Sanitary sewers, force-main and house connections.

Contract B: Sewage treatment plant with a daily capacity of 0.8 m.g.d. and a possible extension of up to 1.6 m.g.d. The treatment is by the activated sludge process with diffused aeration.

Consulting Engineers: R. V. Anderson & Associates, Toronto

Completed: Contract A: September, 1960

Expected Completion Date: Contract B: January, 1961

Estimated Cost: \$587,767.00

No difficulties were encountered during the period of construction and the work of both contractors was very satisfactory.

Toronto Twp. - Metro Toronto (59-S-43)

Description of Project: Contract A: Sewage treatment plant (full treatment by activated sludge process, with digestion) of 5 m.g.d. initial capacity.

Contract B: 60" diameter outlet sewer to Lake Ontario.

Contract C: Lakeshore Road trunk sanitary sewer.

Consulting Engineers: Gore & Storrie Ltd., Toronto

Expected Completion Date: November, 1961

Estimated Cost: \$1,760,000.00

Contract A: The contractor commenced work in June and, aided by good weather conditions, made good progress. By the end of the year about 45% of the work had been completed. Almost all the structural concrete had been poured and the mechanical work was in hand.

Contract B: Dravo of Canada Ltd., commenced work mid-December and had completed about 6% of the contract by the end of the year.

Contract C: The tender advertisement was placed in December but the tendering period had not closed by the end of the year.

Estimated Cost: \$2,022,000.00

Trenton (57-S-4)

Description of Project: Sewage treatment plant (primary with digesters) connecting sewers, sewage pumping stations and forcemain.

Consulting Engineers: Gore & Storrie Ltd., Toronto
Completed: January, 1960
Cost of Contracts: \$459,052.07

The sewage pumping station and sewage treatment plant were put into operation towards the end of January although some deficiencies took some weeks to correct.

Waterloo (58-S-22)

Description of Project: Sewage treatment plant
Consulting Engineers: Proctor & Redfern, Toronto
Expected Completion Date: April, 1961
Estimated Cost: \$672,188.00

This project consisted of the extension of the existing primary treatment plant by addition of aeration tanks, secondary clarifiers and a filter and control building. The plant was put into operation in July, 1960, but some modifications were still required.

Warton (58-S-21)

Description of Project: Pumping station, forcemain and lagoon.
Consulting Engineers: Hisey & Barrington, Richmond Hill
Expected Completion Date: June 30, 1961
Estimated Cost: \$118,900.00

This project was substantially complete. The only item remaining was the repair of one corner of the lagoon. This repair work was to be completed by the end of June, 1961.

Winchester (60-S-49)

Description of Project: Partial sewerage system including lagoon.
Consulting Engineers: J. L. Richards & Assoc. Ltd., Ottawa
Completed: December, 1960
Estimated Cost: \$81,000.00

This project comprised the construction of a partial sewerage system initially serving the Winchester District Hospital, a sewage pumping station, forcemain and a seven-acre lagoon.

Work commenced early in August and with good working conditions the contractor was able to complete most of the work by the middle of November. Delay in delivery of some of the equipment held up operation of the system until December 19, 1960.

LABORATORIES AND RESEARCH DIVISION

F. A. Voegel, Director

The initial part of the year was spent carrying out various activities of the division in temporary quarters at 46 Wellesley Street. After the move to the new laboratory was accomplished on March 28th, it was apparent that the time spent by the staff in helping plan the building and its furniture was paying dividends in increased activity, efficiency and scope of all the work of the division.

The role of the laboratory in the function of the Commission was reiterated by the many speakers at the official opening in November. In conjunction with the opening ceremonies visitors from various parts of Canada and the United States were given an opportunity to inspect and discuss the laboratory facilities.

Although the work of the various branches is discussed more fully later, it is pertinent to note the yearly increases in the combined number of samples analyzed in the laboratory and the field by the chemistry, bacteriology and biology branches. These are listed in the following table:

<u>Samples Analyzed for</u>				
<u>Chemical or Bacterial Content</u>				
<u>(Branches)</u>				
<u>Year</u>	<u>Chemistry</u>	<u>Bacteriology</u>	<u>Biology</u>	<u>Total</u>
1956	3,263	2,632	No	5,915
1957	7,615	5,597	figures	13,212
1958	11,262	8,338	available	19,600
1959	14,077	9,274	-	23,351
1960	17,732	11,214	350	29,296

In assessing these figures it must be remembered that the field work done by laboratory personnel necessitated much more time than the number of samples analyzed would indicate. Also, the figure listed under biology does not include biological collections, identification of specimens, biological measurements (such as, algae counts) or physical measurements.

Although the main function of a large part of the division is to examine samples brought in by others, the division staff also collected an appreciable number of samples in the field in the course of its work. It is interesting to note that the total number of samples collected in this way was 5,107 or approximately 28 per cent of the total number submitted by all Commission staff.

A great many visits were made to the laboratory by individuals and groups interested in observing the layout, equipment, facilities and operation of the laboratory.

Applied research studies were continued in the fields of all the branches. There were investigations into iron and sulphate bacteria and slime-forming organisms; a study on the effect of a high volume of treated sewage in a natural stream, the development of better analytical methods and equipment; the investigation of the use of micro-straining apparatus in polishing sewage treatment plant effluents.

Bacteriology Branch

The year 1960 was one of increased activity and operational change in the bacteriological laboratory. The work load increased by approximately 20 per cent over 1959 even though the time-consuming activities connected with the new building had been expected to reduce work output by a large margin. Following occupancy of the laboratory, substantial changes in operation were made at first to merely be able to handle the work and later to adjust to the new and more efficient facilities as they became available. It was providential that these facilities allowed for more efficient operation at a time when the many construction interferences tended to slow down production. By October with the installation of the incubators, production was normal and the adjustment complete.

Part of the work, undertaken in the summer involved a survey of the Great Lakes. The sampling was carried out in conjunction with the Great Lakes Institute on the federal Department of Transport vessel the "Porte Dauphine". The pollution survey involved the collection of 422 samples with analysis for phenol and the enumeration of coliforms on each sample. These samples were collected from two surveys on Lake Ontario, three on Lake Erie, one on Lake Huron and one on Lake St. Clair and the St. Clair River, during the months of June to August. The preliminary survey was valuable in assessing techniques which could be used on relatively unpolluted wastes and adapted to a ship's laboratory. Results were tabulated and a report prepared.

One-tenth of the year's analytical work was done on the Toronto waterfront and in the area of Lake Ontario extending from Port Union to Hamilton. The surveys carried out here were divided into the Toronto beaches, the Port Credit to Hamilton area and the Port Union area survey.

Investigations into membrane filter methods of cultivating fecal streptococcal bacteria and the organism *Escherichia coli* were started, but terminated shortly after the resignation of the laboratory scientist assigned to this work. These determinations, when carried out on river waters, would aid to characterize the pollutant. However, without the personnel to do preliminary investigations, they could not be routinely applied. Cultural investigations into iron and sulphate bacteria, actinomycetes and slime-forming organisms continued.

Other varied activities of this branch included the following:

- studies of the efficiency of water filters,
- studies on disinfectant properties of some newer materials,

- studies of several enzyme and nutrient preparations presumably sold to cure the ills of sewage treatment systems,
- studies on quantity production of bacterial bodies for use as food for Daphnia,
- collection of pure cultures of micro-organisms,
- studies on biofouling problems in water systems,
- studies on the use of digested sludge for agricultural purposes and
- the preparations of demonstrations for visiting groups.

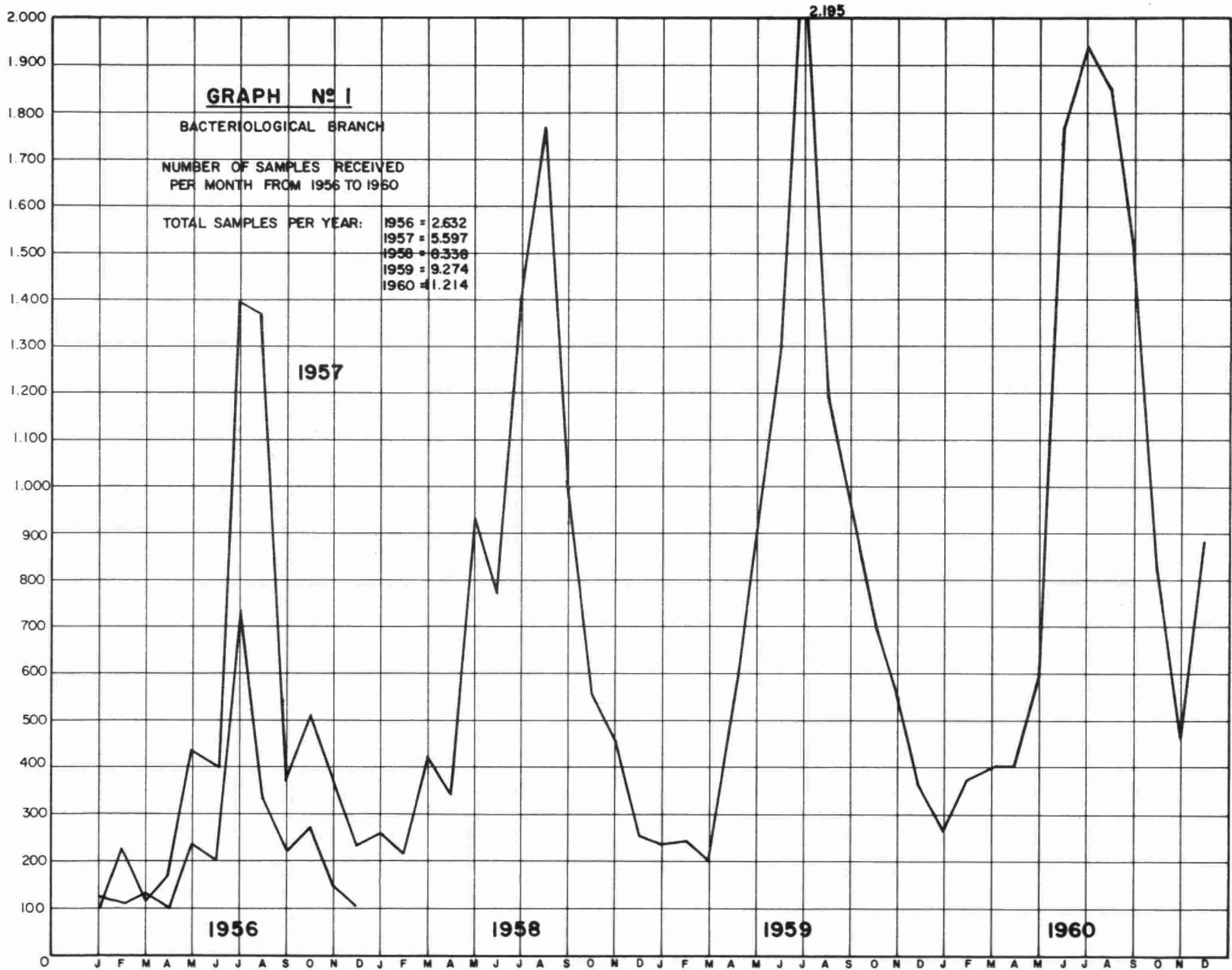
The routine work of the last few years was plotted on a series of graphs using numbers of samples received rather than the total number of determinations. This comparison was made since determination figures for former years were not available. Graph No. I shows the increase in work in 1960 over past years and indicates a trend toward a more even distribution of samples throughout the year. Graph No. II (1960 and 1959) shows this by its broader peaks. This trend was also supported by the estimated number of samples (method was 88 per cent accurate for 1960) expected for the year 1961 found in Graph III.

A further breakdown in 1960 samples is seen in Graph No. IV where the number of sewage, drinking water and surface water samples are plotted separately. It is readily seen that the water and sewage samples were distributed more evenly throughout the year while surface water sampling was low in the spring, fall and winter, but reached huge proportions in the summer. The samples indicated by this peak were submitted mainly by OWRC field personnel. Water and sewage samples, on the other hand, were submitted by both the public and OWRC personnel, and were generally routine samples taken weekly, monthly or each season.

The year 1960 therefore showed a continuing trend towards increased sampling activity throughout the entire year rather than remaining confined to the summer months.



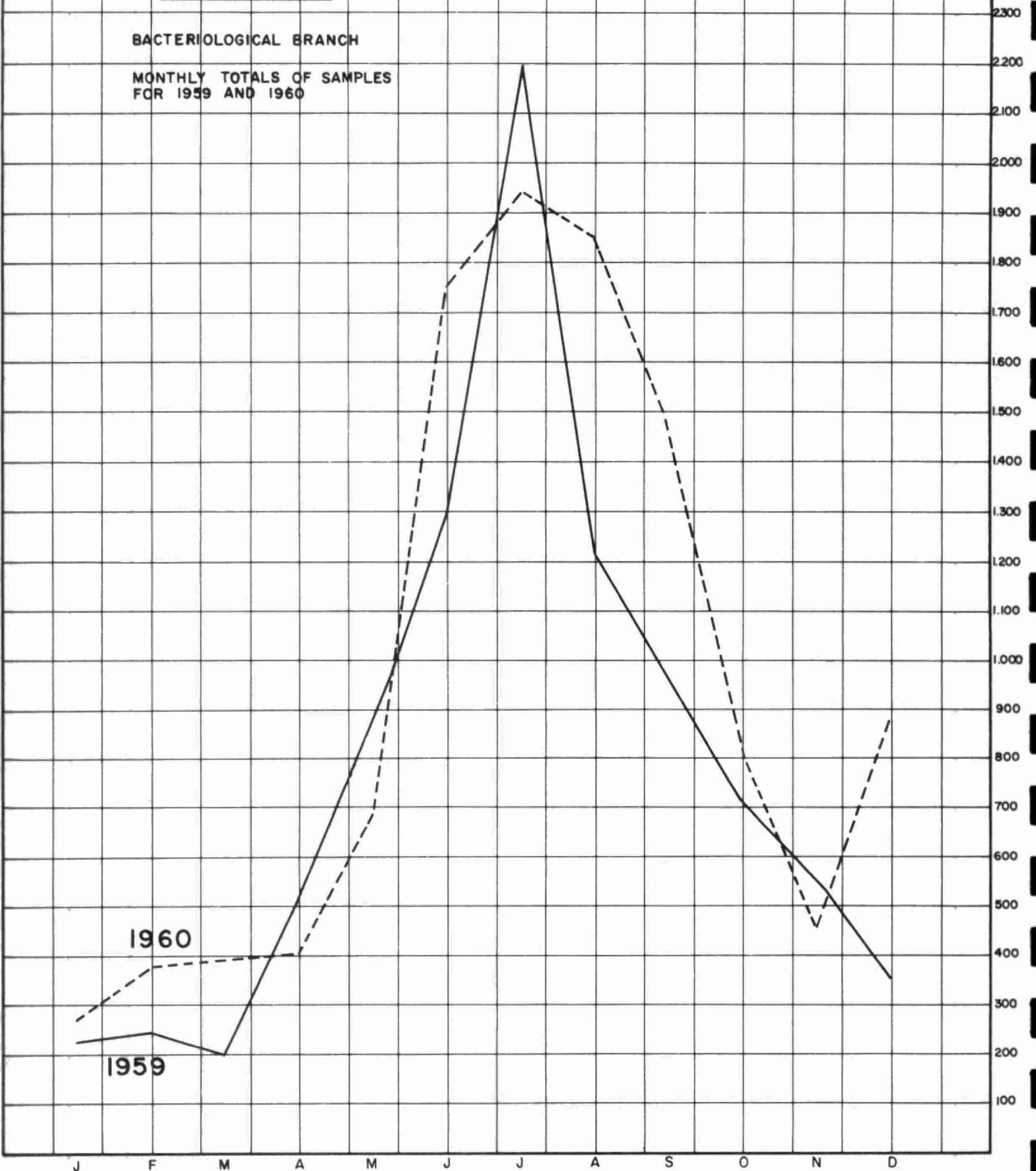
Colourimetry Laboratory



GRAPH № 2

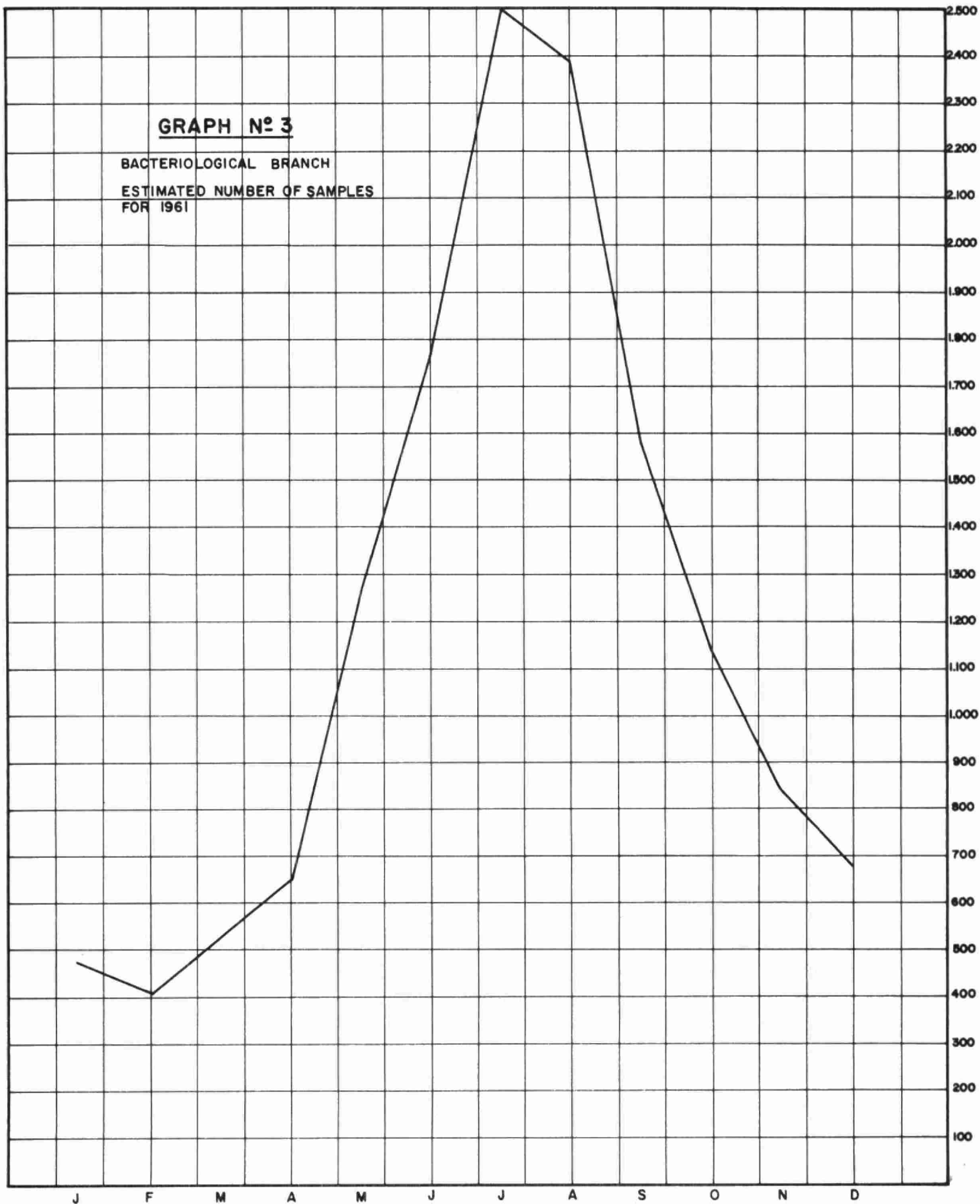
BACTERIOLOGICAL BRANCH

MONTHLY TOTALS OF SAMPLES
FOR 1959 AND 1960



GRAPH Nº 3

BACTERIOLOGICAL BRANCH
ESTIMATED NUMBER OF SAMPLES
FOR 1961



GRAPH N° 4

BACTERIOLOGICAL BRANCH

1960 SAMPLES BROKEN DOWN
INTO WATER, SEWAGE AND
SURFACE WATER.

WATER
SEWAGE
SURFACE WATER

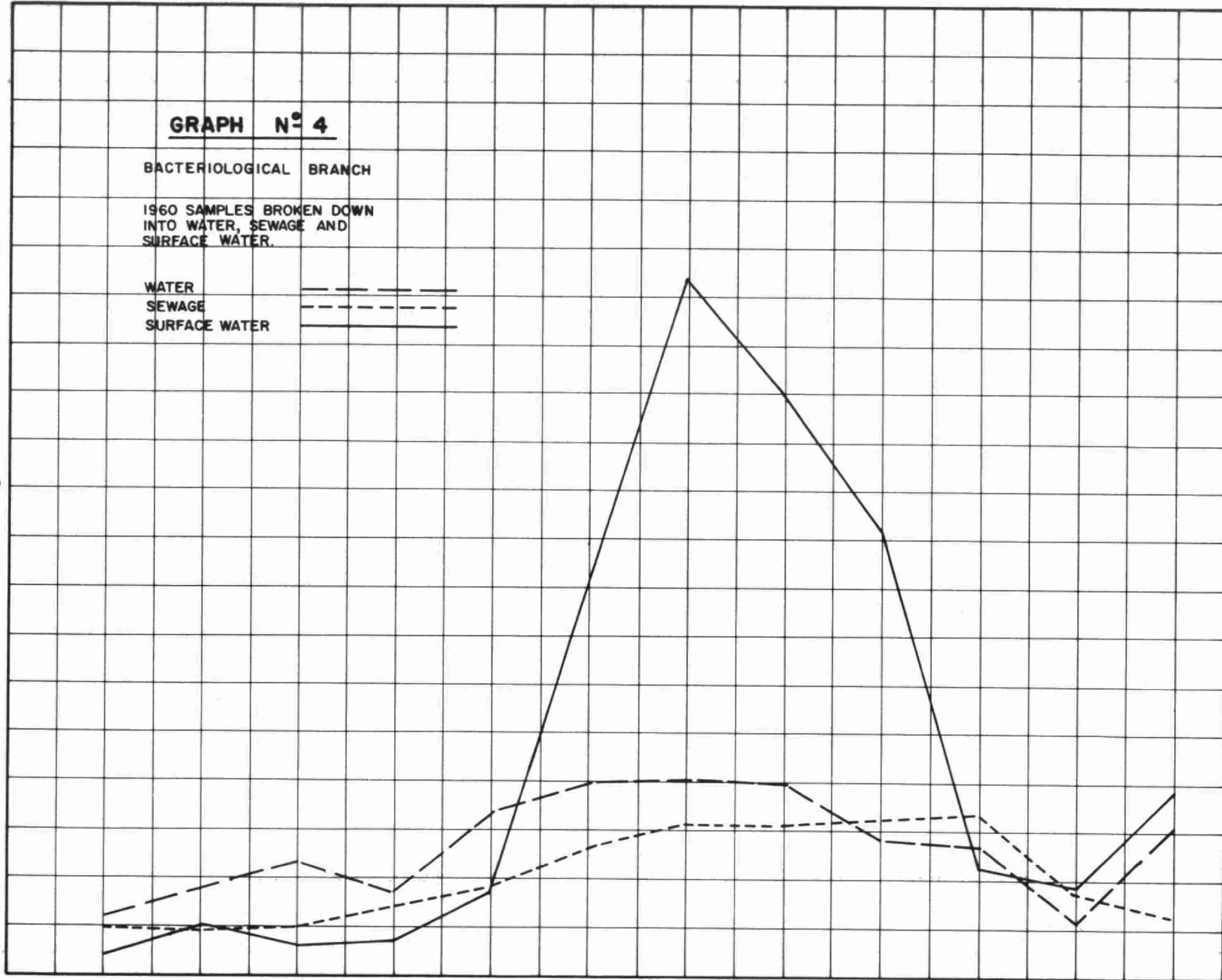
1.500

1.000

500

100

J F M A M J J A S O N D



Biology Branch

The major accomplishments of the biology branch in 1960 included two major field studies, a survey for the International Joint Commission, the presentation of three formal papers, lectures to a number of groups and field inspections and consultation relating to biological problems.

One of the major field investigations was a continuation and expansion of the studies relating to the control of the algae *Cladophora*. This algae previously created serious shoreline nuisances in parts of Lake Ontario and Lake Erie. This year's program was to continue the study of natural factors promoting the excessive growths and the testing of a number of herbicides and algicides to determine their effectiveness, safety and cost. A heavy growth of *Cladophora* did not develop until late in the season in Lake Erie so that the program was broadened to include testing these chemicals on other species of rooted aquatic plants. Considerable worthwhile data was collected which will provide a basis for recommendations for plant and algae control. The demand for these chemicals is rapidly increasing and each year the number of inquiries for permission to treat approximately doubles. Many of the chemicals are toxic to fish and could be toxic to humans or cause taste and odour problems to water supplies. It is of prime importance that this Commission carefully follow the use of these chemicals and, if necessary, impose regulations for their control.

The second major field study was on the effect of a high volume of treated sewage in a natural stream. This indicated a growing need for improved methods of sewage treatment. It was apparent that even with good biological treatment methods undesirable conditions still develop in the receiving stream. Observations on fish, plants, insects and invertebrate life showed a definite change from clean water forms to heavy growths of often undesirable and useless species. Excessive quantities of plant nutrients were considered as the prime factor in creating these conditions.

In addition to these research programs many inspections of problems relating to water supply, pollution control, the treatment of wastes and the control of aquatic nuisances were undertaken. A number of municipalities were assisted at times when algae reduced the hydraulic capacity of their filters and studies and recommendations were made regarding the effects of municipal and industrial wastes on the receiving water. The collection of information on the operation of oxidation ponds for the treatment of municipal and industrial wastes continued. This is a process of ponding where the growth of algae and other life is encouraged. Many small municipalities and some industries were using this effective, inexpensive treatment procedure. A number of inspections and recommendations were made where fish, algae, aquatic plants or aquatic insects created nuisances. These may or may not have been the result of pollution.

The biological aspect of the work of the Commission was becoming more and more important. This was evidenced in the increasing demand for formal papers and lecture courses.

The biology branch provides an information and consultative service to other members of the Commission, consulting engineers and other interested persons.

Chemistry Branch

Apart from the pronounced increases in routine analytical work which are illustrated in accompanying graphs, the most important activity of the year was the long-awaited transition to the new OWRC laboratory quarters. Continual close inspection of the installation of laboratory furnishings and instruments was required both before and after occupancy, in order to ensure that this technical equipment conformed adequately to the stated specifications in many of the contracts awarded.

The addition of infrared spectrophotometric equipment and of a specialist proficient in this work noticeably improved the laboratory's capacity to identify and measure organic pollutants, and allowed resumption of the carbon filter studies of trace organic materials in surface waters. The continuous absorption sampling assemblies used in these studies were placed in operation at Hamilton and Burlington. A misapprehension appears to be prevalent regarding the use of infrared equipment. It is uniquely valuable in identifying specific organic chemical substances, and can distinguish among various grades of mixtures even when these consist of similar chemical materials, for example, among gasoline, kerosene, and various other grades of petroleum products. However, when the production processes among manufacturers in the same field are identical, as they so often are, there are seldom any distinguishing features, even using infrared by which one manufacturer's product may be differentiated from another's. It is common to find that competitive chemical products are manufactured to similar, if not identical, specifications.



Infra-red Spectrophotometer

Field work by the chemical laboratory included participation in the International Joint Commission Rainy River Survey, and a weekly offshore pollution survey of Lake Ontario from Port Credit to Hamilton. It is worthy of note that chemical samples collected by various agencies from Lake Ontario and submitted to the OWRC chemical laboratory formed almost one-tenth of the yearly total of all samples analyzed.

The chemical investigations planned in the IJC Rainy River Survey taxed the limited technical staff provided and only through continuous overtime work by the OWRC chemical laboratory staff assigned to this survey, was the original scope of the work approached.

Graph I - Although increases in numbers of samples analyzed is the basic index of increased production, a more precise assessment is given by the total number of individual determinations performed

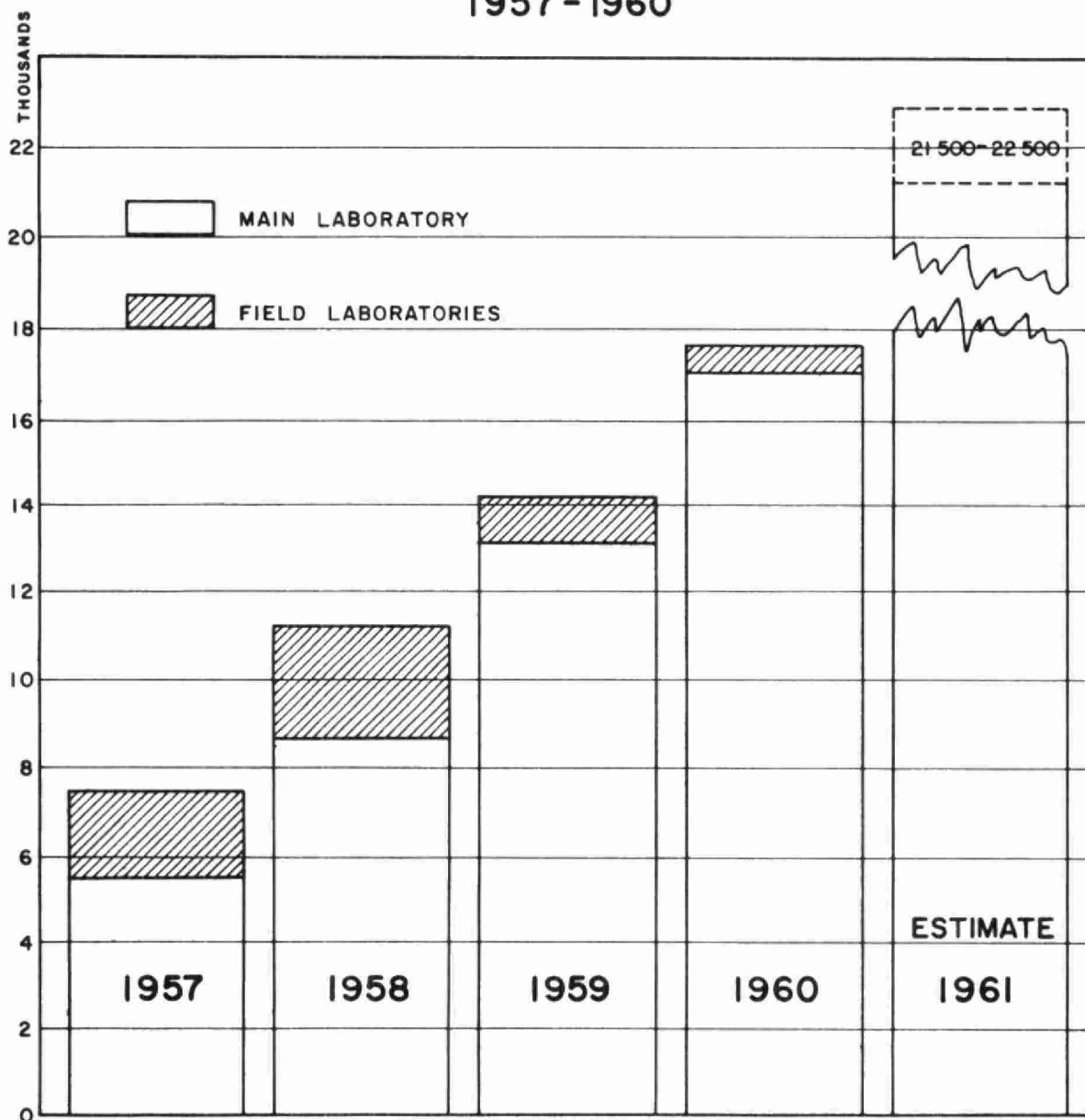
TOTAL YEARLY SAMPLES

- 51 -

INCLUDING FIELD LABORATORIES

CHEMISTRY BRANCH - OWRC LABORATORIES

1957-1960



SAMPLES	1957	1958	1959	1960
SEWAGE	2 862	4 285	6 308	8 191
RIVER	1 329	2 155	2 529	4 220
WATER	927	1 180	2 913	2 936
IND. WASTE	392	941	1 302	1 548
MAIN LAB. TOTAL	5 510	8 561	13 052	16 895
INCREASE -% INDEX	100%	156%	236%	307%
FIELD LABORATORIES	2 105	2 701	1 025	837
OVERALL TOTAL	7 615	11 262	14 077	17 732
INCREASE -% INDEX	100%	148%	185%	233%

GRAPH 1

(tabulated below) since, especially in field laboratory work, the average number of tests per sample has been increasing.

Overall Total of Individual Determinations, including Field Laboratory

	Total	Increase - % Index
1957	29,365	
1958	50,071	100%
1959	62,134	171%
1960	85,529	212%
Estimate-1961	110,000 - 120,000	291%

In three years since 1957, the main chemical laboratory sample analysis output increased over three-fold, and the overall rise in individual tests performed reached almost three-fold.

During the same period, for comparison, both the permanent and the casual summer staff showed only a two-fold increase.

This disproportionate increase in sample numbers has been a continuing problem although distinct increases in efficiency (output per man) have been achieved. Overload conditions reached critical proportions during the late summer and fall of 1958, and recurred more intensely during 1960. From early July through November this year, a chronic accumulation of incomplete analysis persisted. At the peak in September, incompleted samples had amassed to a total of 1,400 which were not finally caught up till November 25.

The apparent reduction in field laboratory work this year is not as great as indicated in Graph I, since the Lake Ontario Survey samples, although actually field work, were included among the samples analyzed at the main laboratory. The graph illustrates the erratic variations in the yearly amount of field work, compared to the more stable, rapid rate of increase in the main laboratory sample totals.

Graph II - The characteristic annual warm weather peak in the monthly average showed a promising broadening in 1960. That is, the acute peaks previously shown as in 1959 were spread out. Had sufficient trained permanent staff been available to avoid overload, this would have allowed more stable, more efficient processing of the samples.

Graph III - This illustrates the contribution each type of sample makes toward the warm weather peak. Sewage samples characteristically show a step-like rise to a plateau which continues without pronounced fall through to the ensuing year.

The water supply sample arrival curve shows, if the March-April dip is ignored (sampling reduced by request during move), a relatively stable monthly rate of arrival.

The river and industrial wastes samples are shown to be the

main contributions to the intense summer peak load. These are then the samples whose rate of sampling, if adjusted more evenly, and especially if advanced towards the spring months, could allow a more even analytical output, and during the early summer, a greater output per employee.

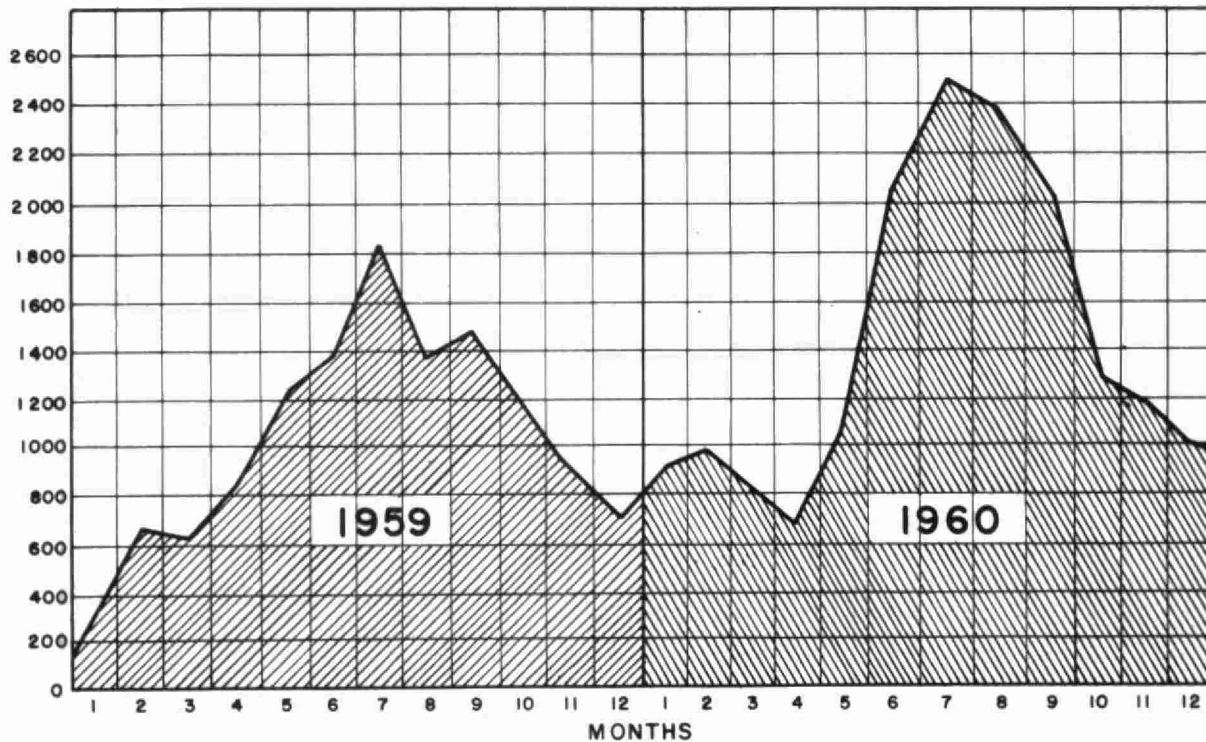
Graph IV - This illustrates the pronounced, persistent random variations in weekly sample arrivals, which create many problems in organizing the analytical laboratory work from week to week.

Graph V - The sections of the laboratory were originally organized each to handle a separate type of sample which required its own characteristic analysis. Hence, the laboratory sections were identified by corresponding names. However, an increasing number of samples require tests in addition to the characteristic routine analysis, and are processed through two and often all three sections before a suitable examination is completed. Thus, there is no direct correlation among the numbers of various types of samples and the amount of analytical work performed in the section identified by the same name, and all three sections share in the summer peak load.

Graph VI - This illustrates the basic demand for laboratory analysis exerted by non-OWRC (public) sample contributors to which is added a pronounced peak load during the warm weather intensification of OWRC sampling activities.

MONTHLY SAMPLE TOTALS

MAIN CHEMICAL LABORATORY
CHEMICAL BRANCH — OWRC LABORATORIES
COMPARISON 1959-1960

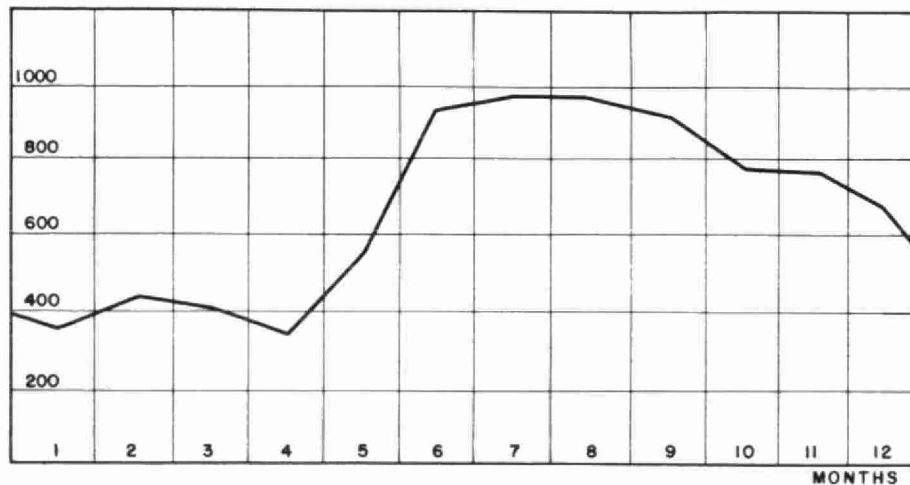


MONTH		NO. OF SAMPLES RECEIVED	
		1959	1960
1	JANUARY	159	903
2	FEBRUARY	672	976
3	MARCH	657	817
4	APRIL	857	676
5	MAY	1225	1051
6	JUNE	1390	2076
7	JULY	1838 MAXIMA	2478 MAXIMA
8	AUGUST	1328	2385
9	SEPTEMBER	1472	2017
10	OCTOBER	1196	1311
11	NOVEMBER	904	1200
12	DECEMBER	714	1005
TOTAL		13052	16895

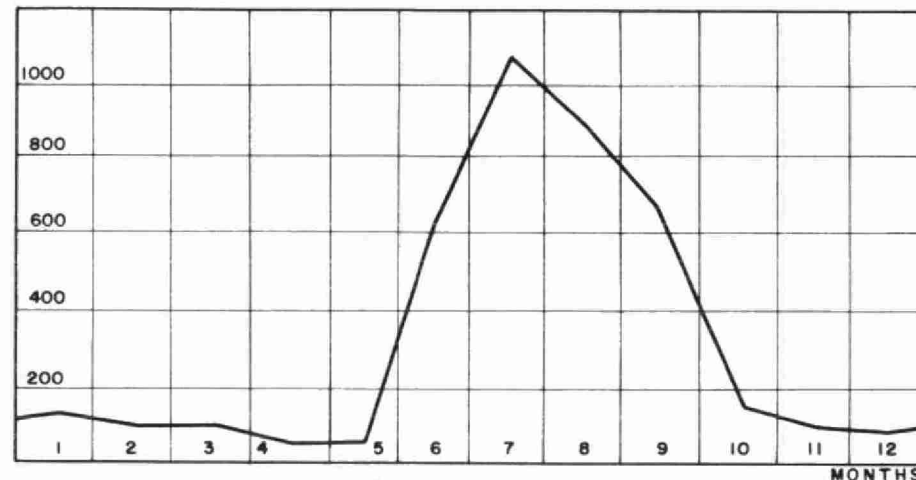
GRAPH 2

MAIN CHEMICAL LABORATORY

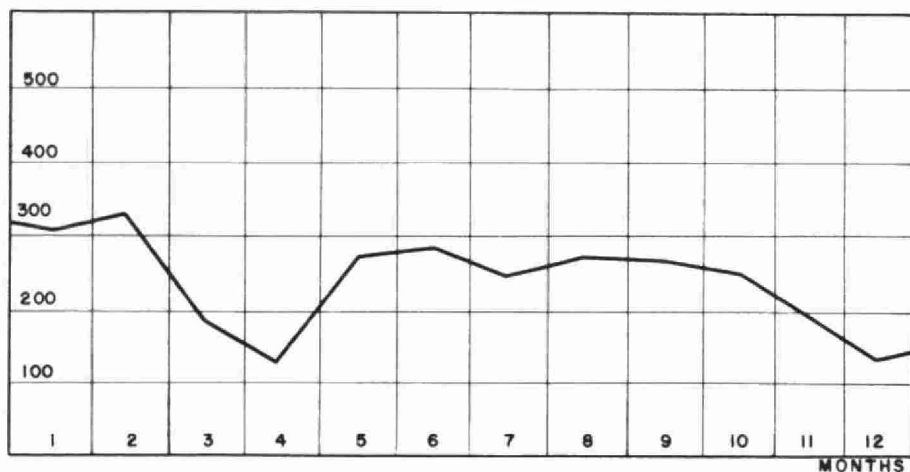
INCOMING SAMPLES MONTHLY VARIATIONS BY TYPE OF SAMPLES



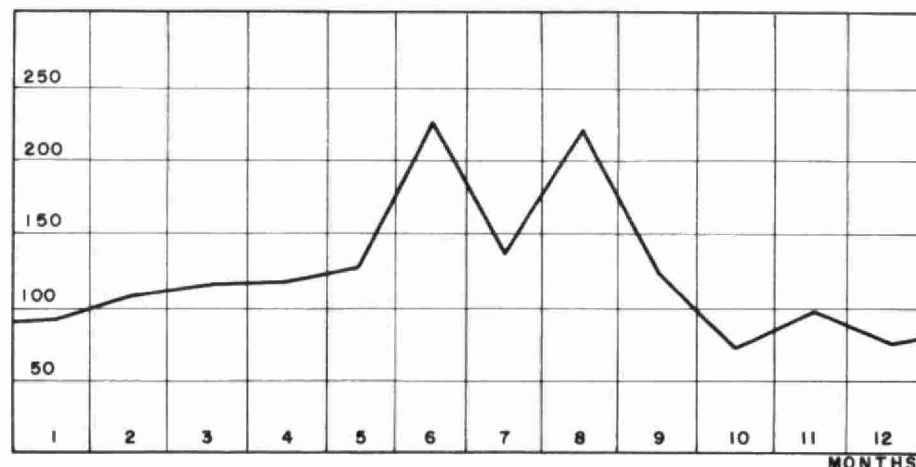
SEWAGE SAMPLES: WASTE WATERS, INCLUDING SEWAGE TREATMENT PLANT EFFICIENCY CHECKING PROGRAM



RIVER SAMPLES: POLLUTION EXAMINATIONS OF UNDER - GROUND AND SURFACE WATERS, INCLUDING STREAM SAMPLING PROGRAM



WATER SAMPLES: MINERAL ANALYSES AND WATER-SUPPLIES

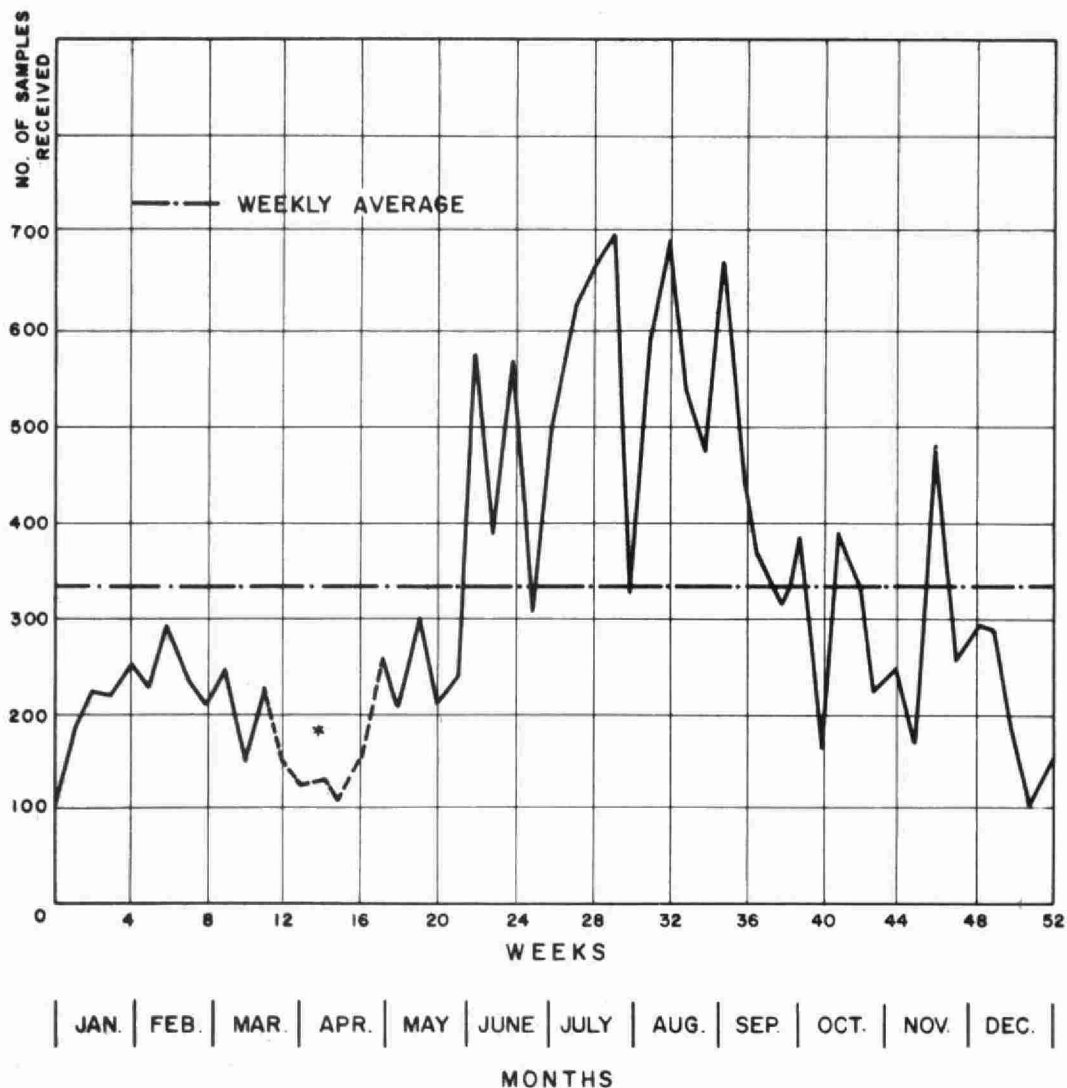


INDUSTRIAL WASTE SAMPLES: COLLECTED BY INDUSTRIAL WASTE BRANCH ONLY

GRAPH 3

INCOMING SAMPLES WEEKLY VARIATIONS

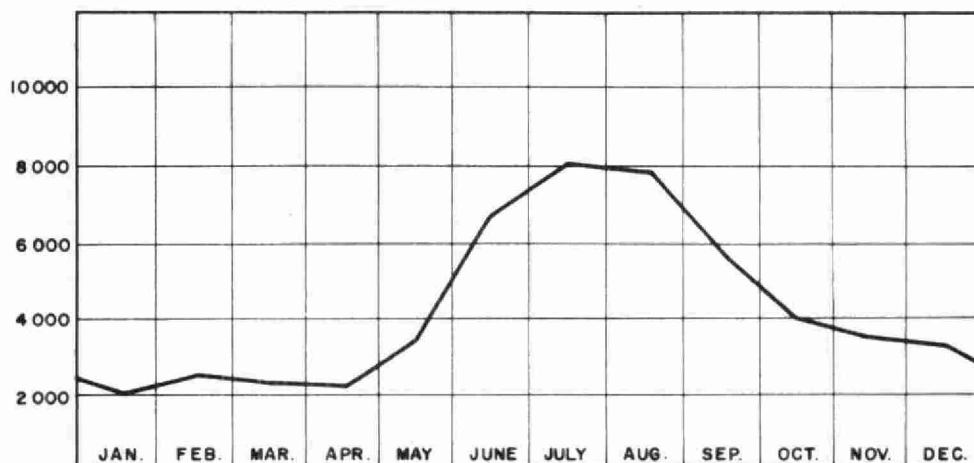
MAIN CHEMICAL LABORATORY
CHEMISTRY BRANCH
OWRC LABORATORIES



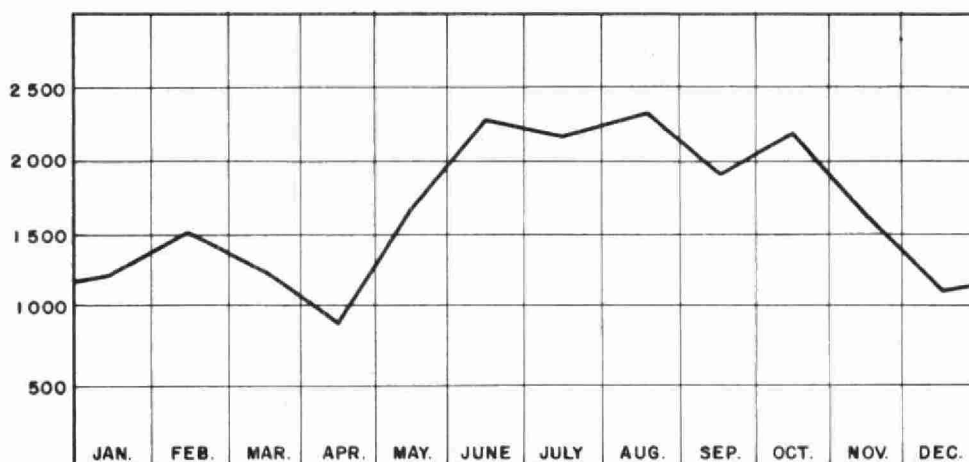
*) ----- NUMBERS OF SAMPLES REDUCED BY REQUEST DURING MOVE
TO NEW LABORATORY QUARTERS

GRAPH 4

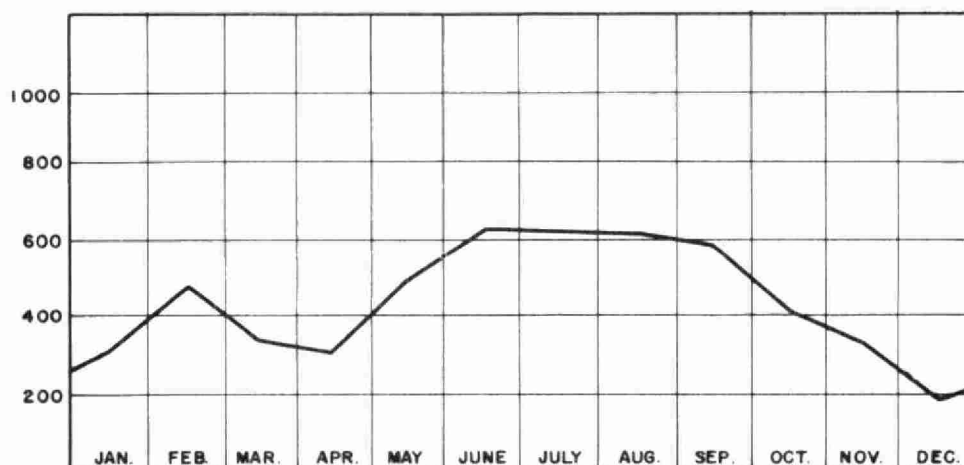
MONTHLY RECORD

NUMBER OF TESTS PERFORMED
BY EACH SECTION

SEWAGE SECTION: BASIC WASTE WATER AND POLLUTION TESTS, INCLUDING BOD, SOLIDS AND NITROGEN TESTS

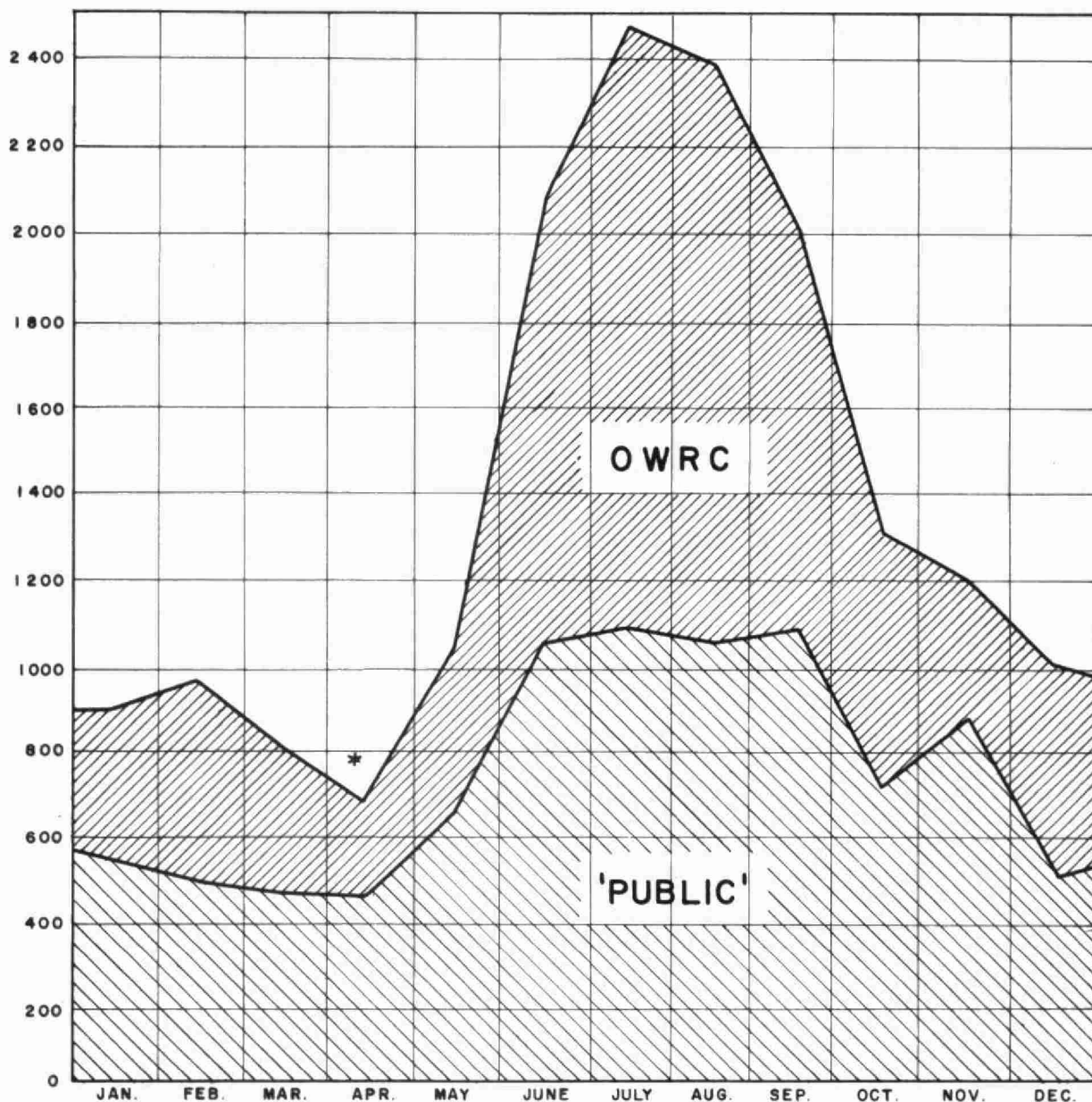


WATER SECTION: WATER SUPPLY MINERAL QUALITY TESTS, INCLUDING HARDNESS, pH, IRON, FLUORIDE, ETC.



INDUSTRIAL WASTE SECTION: IDENTIFICATION AND MEASUREMENT OF SPECIFIC CONTAMINANTS BOTH TOXIC AND DELETERIOUS, INCLUDING ORGANICS, TOXIC METALS ETC.

MAIN CHEMICAL LABORATORY COMPARISON SAMPLES SUBMITTED BY OWRC AND 'PUBLIC' SOURCES



SOURCES :

OWRC — SANITARY ENGINEERING
 WATER RESOURCES
 STREAM SANITATION
 LABORATORIES
 PLANT OPERATIONS

'PUBLIC' — PROVINCIAL DEPTS. —
 LANDS & FORESTS,
 HEALTH
 MUNICIPAL
 PRIVATE
 COMMERCIAL-INDUSTRY, BUSINESS

*) NUMBERS OF SAMPLES REDUCED BY REQUEST
 DURING MOVE TO NEW LABORATORY QUARTERS

GRAPH 6

Industrial Waste Branch

In performing its function as a technical service unit, the Industrial Waste Branch conducted several extensive surveys and numerous special investigations in 1960 and provided consultative service to industries with special waste disposal problems.

Surveillance was maintained on a number of potential sources of pollution. The progress made by industries and municipalities in carrying out recommendations for pollution abatement and control was followed closely. For the most part, good co-operation was obtained from industry, and, in turn, the Industrial Waste Branch was able to advise on waste problems arising from both new and established processes.

A large proportion of the work load on this branch was attributed to county or district surveys in which all industries in a defined area were considered. The industrial waste section of the Haldimand County survey was completed and surveys which covered some 115 industries were initiated in Carleton County, Windsor, Sudbury, Fort Frances, Kenora and Red Rock. The field work was completed and the reports were to be completed for distribution early in 1961. The Fort Frances survey was conducted in co-operation with the State of Minnesota as part of a detailed International Joint Commission study of pollution of boundary waters in the Rainy River area. Such industries as pulp and paper mills, mines and smelters, manufacturing and metal working plants, and food processing factories were studied in the course of these surveys.

A number of investigations concerned with miscellaneous industrial waste discharges to watercourses, streams and lakes were made. Sources of oil, phenol and pickle liquor were traced and measures suggested to prevent the escape of these contaminants to watercourses.

Solid oil refinery wastes, such as caustic phenolates and sludges, presented an interesting disposal problem. Contract hauling of such wastes to isolated sites on high ground for land disposal has been practiced. Frequent visits were made to these sites by industrial waste personnel to assure that no seepage to watercourses was taking place. Custom disposal of similar wastes by incineration was introduced in the Sarnia area.

Sewage treatment plants in Brantford, Waterloo, Brampton, Stratford, and Woodstock experienced difficulties due to the nature and quantities of industrial wastes treated. Studies were made to determine how the problems could be solved and to obtain the co-operation of the industries involved. Improvements were noted at Brantford and work is continuing at the other locations.

The formation of industry-wide associations in the pulp and paper and petroleum fields for research on pollution abatement was noted with satisfaction. This branch planned to co-operate extensively in these endeavors.

In the pulp and paper field, some improvement was noted in the

Wabigoon River, although some 40 miles of river were still heavily polluted. At Thorold, a situation arising from the diversion of paper mill wastes and sanitary sewage from the Old Welland Canal to Gibson Lake existed until fall. The paper company continued its researches on utilization of by-products and the treatment of waste materials. Construction of a power dam on the Ottawa River at Carillon would undoubtedly cause changes in the stream, and, as a pulp mill was discharging wastes into the stream where there was rapid dispersion, a survey was made of conditions for future reference. This information would prove valuable for comparison purposes after the power project was completed.

Problems involving plating and metal finishing wastes were given considerable attention. Many of these wastes as well as being toxic to humans and animals are detrimental to the functions of sewage treatment plants. More than 50 industries of this type were visited. When the seriousness was pointed out, most industries endeavored to eliminate or reduce the concentration of harmful constituents in their waste effluents. The industrial waste branch staff devoted much time to the study of methods of removal or recovery of valuable metals.

The staff of the industrial waste branch included seven engineers and one chemist and it was hoped to further expand this number to include technicians as well as additional university graduates.

Expansion of staff appeared to be necessary to overcome the difficulty that had been encountered in following up recommendations made to industries and municipalities. The full effectiveness of industrial waste surveys had not always been obtained when the staff has necessarily had to turn its attention to other investigations. It was hoped, in the future, to assign a part of the staff to work on an area (district) basis and the remainder to specific fields of industrial waste investigation to permit the specialized study often required.

Purification Processes Branch

The work for the year included several projects started in 1959.

At Acton, the springs used as part of the town water supply had shown strong indications of pollution. Spray irrigation of tannery waste in nearby fields was suspected and in the fall of 1959 a quantity of fluorescein dye was added to the waste. The dye was first detected in the spring water late in January 1960. This was a definite indication that the springs were drawing water from the area used for spray irrigation. The fields closest to the springs were not used for waste disposal during 1960 and samples of the spring water were still being taken at regular intervals at the year-end and analyzed to determine the persistence of the pollution.

Also, at Acton, in conjunction with the biological branch, a small oxidation pond was set up to determine if tannery waste

could be disposed of in this manner. Operations had to be discontinued during the winter when the pond was ice covered but were started again as soon as the ice had melted. A rate of oxidation was obtained that was encouraging but it was never possible to build up a good growth of algae. It appeared that there was something in the tannery waste that inhibited the algae growth and as algae is essential to the operation of an oxidation pond, the research was discontinued.

Work on dialysis was also continued from the previous year. A large sample of waste chromic acid was obtained from an aluminum anodizing process. Iron salts accumulate in this acid and make it useless for further work and it was hoped that a separation of the chromic acid and iron salts could be made. It was found however, that a satisfactory separation could not be made.

The micro-strainer was installed this year at the new Brampton s.t.p. to carry on the work started last year at the Streetsville plant. The results obtained the previous year were confirmed and it was shown that a good reduction in suspended solids and BOD could be obtained. This equipment should be useful for polishing sewage treatment plant effluents where a high quality effluent is necessary.

During the past summer the Strathcona Paper Company disposed of all its waste by spray irrigation and the quality of the water at Napanee was very good. Since the cold weather set in and it became necessary to use the lagoons for waste disposal there were some complaints of taste in the water. The very low flow in the Napanee River made the taste and odor of the water worse than it would be normally.

The consulting engineer for the town of Marmora investigated the use of a diatomite filter for treating the municipal water supply. It would appear that a number of these filters might be installed in Ontario in the future. As there was no one on the staff familiar with this type of equipment, a small filter was installed in the laboratory. It was operated for several months on Humber River water and gave several members of the staff an opportunity to become familiar with the operation and problems associated with this type of filter.

A new type mechanical aerator was being tested in the laboratory. The first work was done with a small laboratory model, and the results obtained were good. A working size model was being installed and it was planned to continue the test on oxygen absorption and also estimate the power consumption per unit of oxygen absorbed.

In conjunction with D. H. Matheson of Hamilton, a new type of recording turbidimeter was investigated. The meter was installed at the Hamilton water treatment plant and operated for a period of two months. The only criticism of the meter was the cost of operation and suggestions were made that should reduce this cost to an acceptable amount.

Equipment was set up in the laboratory to measure the filterability of water. This was installed as an aid in the micro-strainer work but was being made available for any filtration work.

Technical help was given to several of the water works during the year. Investigations into chlorophenol tastes were carried out at Belleville, Port Credit, Dunnville and Streetsville. Coagulation tests were made at Delhi and Leamington. A stability test was made at Richmond Hill and disposal of the back wash water from the iron removal plant was investigated. Tests were made and treatment recommended for gasoline in a water supply for a subdivision north of Kingston.

PLANT OPERATIONS DIVISION

D.S. Caverly, Director

The OWRC is responsible for the operation, maintenance and control of all projects which it constructs, and this is carried out through the Division of Plant Operations. The division, formed in April, 1958, has completed its third year of ever expanding activity.

When construction of a project is completed and the works are ready to be put into service, they become the responsibility of this division. With approximately 30 projects being constructed each year, it can be seen that the division's rate of growth has been substantial. The following statistics may better illustrate this point:

(a) Capital Cost of Works in Operation,

1958	-	\$8,335,000.00
1959	-	\$14,125,000.00
1960	-	\$32,807,000.00

(b) Total Operating Cost of the projects for the year 1960,
\$586,452.94

(c) Number of plant operators employed,

1958	-	15
1959	-	22
1960	-	92

(d) Division Head Office Staff,

1958	-	6
1959	-	14
1960	-	22

(e) Number of projects in operation,

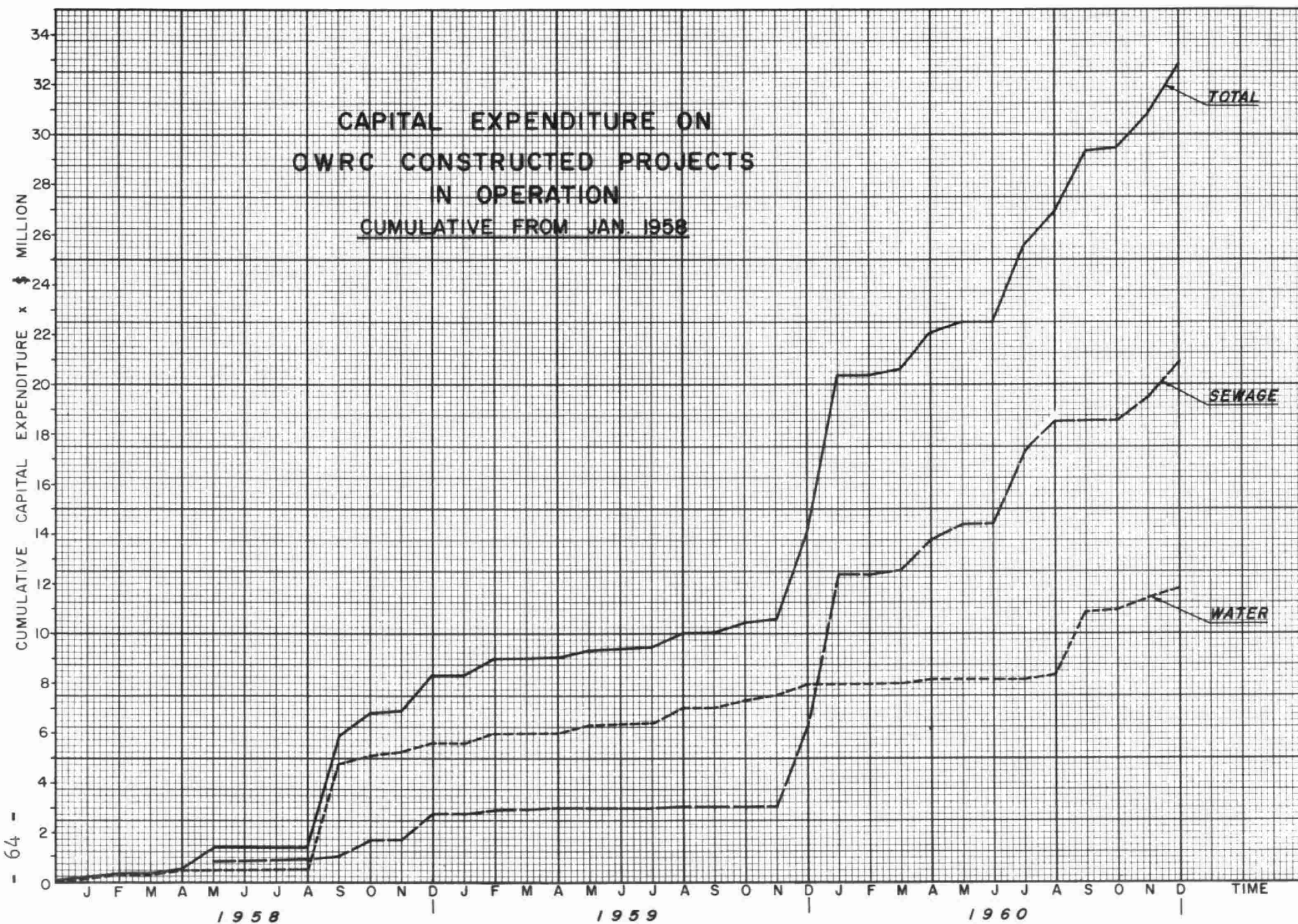
<u>Water</u>		<u>Sewage</u>	
1958	- 9	1958	- 6
1959	- 21	1959	- 13
1960	- 32	1960	- 33

Total gallons of sewage received in 1960 - 8,700,000,000

Total gallons of water distributed in 1960 - 2,100,000,000

Descriptive brochures were prepared for six formal openings of projects held during 1960.

A graph of the accumulative capital expenditure since January, 1958 up to the end of 1960, will be found on the next page.



The year was highlighted by the setting up of card control of all preventative and emergency maintenance procedures. In addition to detailed plant performance data, labor and materials, maintenance costs were being catalogued according to type and make of equipment.

Process quality control and the economics of plant operation were the objects of intensive investigation by the engineering staff.

The close supervisory control maintained over each project through the two division supervisors and seven project engineers, was of particular benefit to the small municipalities where neither engineering nor technical facilities were readily available locally.

An operations data processing section was being developed. This was still in its formulative stage at the year-end but with the Commission occupying a unique position insofar as the number and variety of water and sewage treatment plants under its control was concerned this section held much promise of adding measurably to the total knowledge of the science through meaningful statistical analysis.

Close liaison was maintained with municipal authorities through their local water and sewage advisory committees.

The policy of using local advisory committees has proven most successful. While the OWRC was responsible for the management, operation and control of all projects which it constructed for municipalities, its policy was to work in close co-operation with the municipality, and the advisory committee was used for this purpose.

Most committees set up consisted of either civic representatives or civic staff or a combination of both. In some instances, council as a whole was used. In only some of the smaller projects which involved no operation, were there no committees, and the division dealt with appropriate civic staff directly.

The committees meet regularly with the representatives of the OWRC to discuss all matters relating to the projects concerned. By the end of 1960 the Division was dealing with approximately 60 local advisory committees.

The following is a list of those projects that came under the jurisdiction of this division during the year of 1960:

Barrie (59-S-31)

A sewage pumping station and forcemain.

Brampton (58-S-14)

Sanitary trunk sewers and a complete activated sludge treatment plant of one million gallons per day capacity. Also included in this project was a sewage pumping station and forcemain serving

the Bramalea sub-division in the Township of Chinguacousy.

Brantford (58-S-11)

Complete activated sludge treatment plant with vacuum filtration of digested sludge and a capacity of 12 m.g.d.

Burlington (58-S-28)

A complete activated sludge treatment plant with capacity of 750,000 g.p.d. located at Elizabeth Gardens.

Fergus (58-S-23)

A complete activated sludge treatment plant of 600,000 gallons per day.

Galt (59-S-30)

Sanitary trunk sewers.

Georgetown (58-S-17)

A complete activated sludge treatment plant of capacity 1.5 m.g.d.

Hespeler (59-S-37)

Sanitary Trunk sewers.

Kitchener (58-S-19)

A primary treatment plant at Doon with vacuum filtration of digested sludge. Capacity--11.5 m.g.d. Also included in this project was a sewage pumping station and forcemain replacing the old Spring Valley sewage treatment plant.

Leamington (58-S-26)
(59-S-28)

Sanitary trunk sewers.

Listowel (58-S-25)

Sanitary sewers, pumping station, forcemain, and lagoon.

London Township (58-S-27)

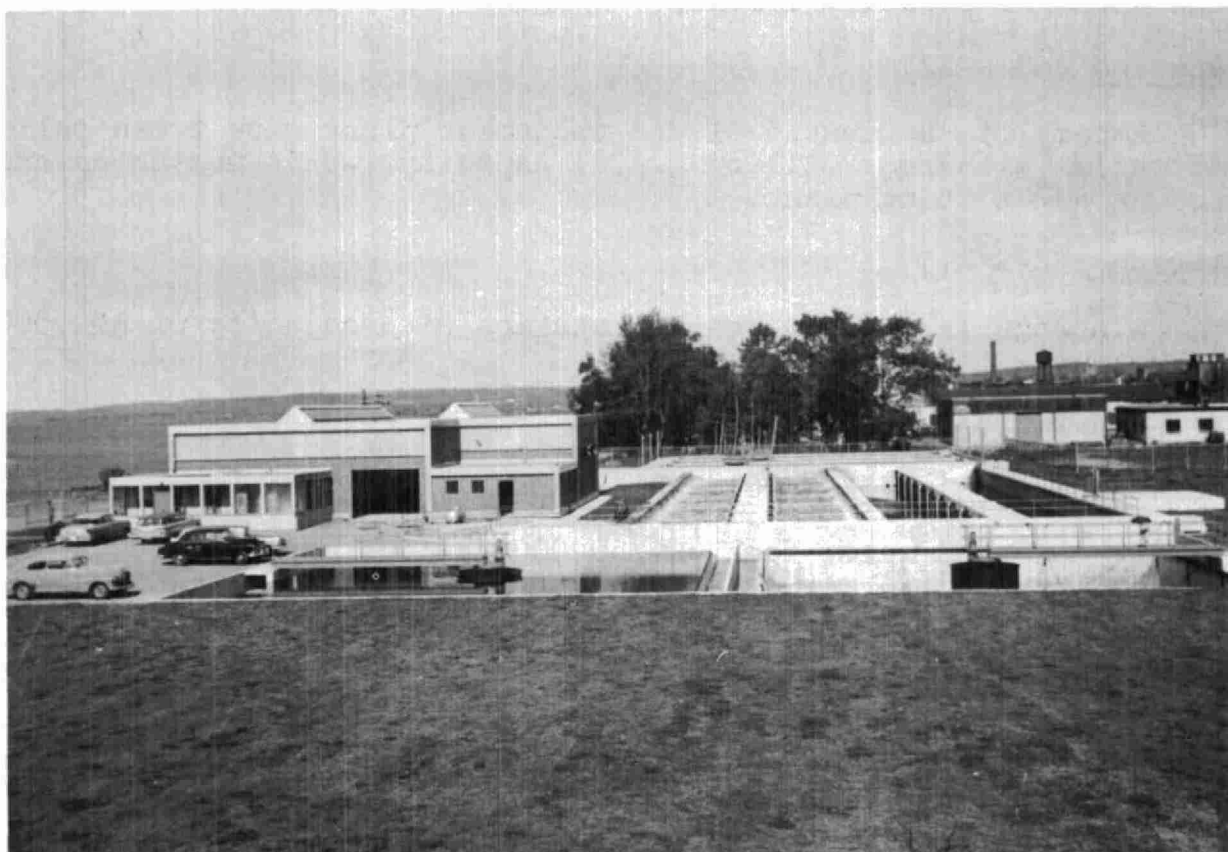
A complete activated sludge treatment plant with vacuum filtration of raw sludge, with a capacity of 600,000 g.p.d.

Markham Village (59-S-40)

A complete activated sludge treatment plant with capacity of 400,000 g.p.d.

Nepean Township (59-S-35)

A sewerage system and two pumping stations of capacity 200,000 g.p.d. The treatment plant is still under construction.



OWRC-built Sewage Treatment Plant Serves Three Municipalities

North Bay (58-S-10)

A complete activated sludge sewage treatment plant with capacity of four m.g.d. dry weather flow. Also included in this project were trunk sewers and pumping stations in North Bay and the townships of Widdifield and West Ferris.

Orangeville (58-S-60)

A complete activated sludge sewage treatment plant with capacity of 250,000 g.p.d., but being able to provide primary treatment only to 750,000 g.p.d. This was a renovation of an existing plant.

Port Arthur (58-S-13)

Trunk storm and sanitary sewers together with a primary treatment plant with two million g.p.d. capacity.

Stirling (58-S-18)

Sanitary sewers, three pumping stations with forcemain and a lagoon.

Trenton (57-S-4)

Trunk sewers, pumping station, forcemain and a primary treatment plant of capacity 1 m.g.d.

Waterloo (58-S-22)

A complete activated sludge treatment plant with fresh solids filtration with four million g.p.d. capacity. This was an enlargement of an existing plant.

Wiaraton (58-S-21)

A sewage lagoon and pumping station with capacity of 150,000 g.p.d.

Water Projects

Ancaster Township (58-W-26)

An elevated water tank of 750,000 gallons capacity.

Bath (59-W-40)

Water mains and hydrants.

Bracebridge (58-W-27)

Water mains, hydrants, reservoir and two small pumphouses serving Bracebridge and adjacent townships.

Chesterville (59-W-46)

Two deep wells and pumphouses, a 125,000 gallon elevated storage tank and a complete distribution system.

Dunnville (58-W-17)

A treatment plant with microstraining and chlorination of 20 million g.p.d. capacity supplying water through two new mains to Dunnville and Port Maitland.

Galt (60-W-63)

Reinforced concrete reservoir.

Hespeler (59-W-33)

Water mains and hydrants.

Huntsville (58-W-19)

Lake intake with crib, low lift pumping station, and forcemain to existing filtration plant.



OWRC-built Filtration Plant Serves Six Municipalities

Meaford (59-W-29)

Lake intake, complete treatment works with filtration and chlorination, 200,000 gallon reservoir, high and low lift pumping stations with capacity of one million g.p.d.

Midland (59-W-49)

Water mains and hydrants.

Orangeville (58-W-20)

A deep well and pumphouse plus a new pumphouse at the existing springs with a total capacity of 800,000 g.p.d.

Preston (58-W-22)

A deep well, pumphouse, reinforced concrete reservoir and water main.

Thedford (59-W-35)

A well, pumphouse, booster station and distribution system.

SANITARY ENGINEERING DIVISION

G. M. Galimbert, Director

The activities of the Sanitary Engineering Division are directed toward two main objectives, the elimination of pollution from the waterways and supervision of the water supplies of the Province. Its work is, therefore, closely allied with those of the health agencies. There is also active participation in the water and sewer projects of the Commission particularly in the field of design and later in the inspection of operating plants.

The major work of the field staff of the Division is the inspection of existing water and sewage works plants including those operated by the Commission. In addition, many stream and pollution surveys are carried out regularly to ascertain the condition of waterways throughout Ontario and to further the program of pollution abatement. The provision of engineering reports relative to the installation of water and sewage services is an aspect of the work that is becoming more time demanding and important. Information relative to the river and pollution surveys accumulated by the district staff is correlated by the Stream Sanitation Division. This section also has under its supervision the draughting room which prepares maps and drawings to complete the various reports.

Approval of Plans of Water and Sewage Projects

The approval of plans of water and sewage works projects for all municipalities in Ontario continues to be a major activity of the division. This work is preceded by discussions with consulting engineers by the water and sewage works supervisors prior to the completion of plans. In many instances considerable changes are made after these evaluations of the original proposals.

During 1960, 702 certificates were issued for water works installations calling for an estimated expenditure of \$29,892,077.75. This was a reduction from the 1959 record of 866 certificates calling for an expenditure of \$42,258,878.41. It would appear that in 1960 the municipalities became more "pollution conscious" and expended more money in that field, diverting it from the provision of water supply facilities. For sewage work installations 993 certificates were issued calling for an estimated expenditure of \$81,145,564.83 compared with 1,109 certificates and \$73,467,124.59 in 1959.

Federal Program Will Increase Sewage Treatment Work

It was expected that a new federal financing program would provide impetus to construction in the sewage works field during 1961. This program was announced late in 1960. This program, directed toward pollution abatement, was to provide funds for building sewage treatment plants and trunk sewers. Many Ontario municipalities were expected to take advantage of this opportunity. This would involve considerably more work in the field of design checking by the sanitary engineering division.

Decrease in Expenditure Estimated in Water and Sewage Fields

The total expenditure estimated for the Province during 1960 for water and sewage projects was \$111,037,642.58. This was a decrease from the total of \$115,726,003.00 reported in 1959. Sewage works comprised 73 per cent of the total, an increase from the 63.7% of 1959. Final certificates on OWRC projects during the year called for an estimated expenditure of \$16,007,895.94, an increase from the \$13,914,017.01 of 1959.

Evaluation of Subdivisions Being Installed in Ontario

An evaluation of the information provided on water supply, sewage disposal and soil conditions in 830 subdivisions was made during the year. In addition, 47 plans of subdivision area control were considered. This work was carried out at the request of the Community Planning Branch of the Department of Municipal Affairs. Several meetings were held during the year to discuss specific problems with members of the staff of that branch.

District Inspection Work

The inspection work of the Sanitary Engineering Division continued to be one of the important endeavors of the Commission. The work continued under the supervision of four district engineers, each of whom covers a designated area in southern Ontario and another in northern Ontario. The routine work included regular inspection of all the water and sewage works plants in the Province, stream and sanitary surveys and investigation of industrial plants with organic waste discharges. The special work included the provision of preliminary reports on water and sewage works projects and investigations carried out at the request of municipalities and the general public. The latter work was becoming more important and would require an increase in staff in 1961, if it was to be covered adequately.

The district staff continued to assist actively in carrying out county water resources and pollution surveys with the Surface Water Branch.

Water Works Inspections

There were 243 inspections made by the district staff of water plants that have treatment facilities divided into 186 municipal, 18 industrial, six military, three institutional and 30 private supplies. This record was almost identical to that of 1959. In addition, 227 general inspections of water works were carried out of which 180 were municipal, five industrial, six institutional and 36 private supplies. Samples totalling 930 for bacteriological analyses and 704 for chemical determinations were secured during the water works inspections.

Sewage Works Inspections

There were 346 sewage treatment plant inspections made during 1960 divided into 209 municipal, 37 industrial, 24 military, 27 institutional and 49 private plants. In addition, 188 sewerage, 488 organic industrial waste plants and 55 drainage inspections were carried out. There were 720 bacterial, 1928 chemical and 25 special samples secured during the sewage works inspections.

Stream Pollution Surveys

There were 143 stream pollution surveys and one algae and plankton investigation carried out in 1960. These surveys were becoming more and more important as the effort to eliminate pollution from the waterways of Ontario continued. The amount of work entailed is indicated by the fact that 2,109 bacteriological and 2,506 chemical samples were secured during these surveys.

Special Investigations

Special investigations requested by municipalities or the public are becoming a major factor in the sanitary engineering program. During 1960 there were a total of 628 of these special investigations. It is interesting to note that the eastern area of the Province had an increase in the number of these requests from 113 to 228 during the year. Preparation of water and sewage reports for 20 Ontario municipalities was included. Sanitary landfill pollution problems were of interest. One investigation of particular significance was the seven-day study of the effects of the Mattagami River flood at Timmins. OWRC personnel assisted in the control and clean-up operations.



Winter-time Stream Sampling

Meetings With Municipal Officials

A major activity of the district engineering staff was the meetings held with a great variety of municipal officials. During 1960, there were 1,072 meetings as follows: 67 council, 223 municipal clerks, 234 other municipal officials, 129 public utilities commissions, 61 consulting engineers, 188 medical officers of health and 170 others. It was hoped, through these meetings, the staff could obtain a better knowledge of the problems existing in the municipalities.

Stream Sanitation Branch

Forty-five complete stream surveys and 10 part surveys were made during the year entailing the collection of samples for chemical and bacteriological analyses at 1,408 sampling points; 218 pollution investigations were made at locations on various streams and lakes. While this work was carried out by the district engineering staff the data was correlated by the stream sanitation section. It was also reported from data compiled that 178 milk plants in the Province have some form of treatment. Of these, 47 had satisfactory treatment and 131 did not. Of 105 canneries listed, 48 discharged wastes directly or with some preliminary screening or settling to streams or municipal storm sewers and

were not satisfactory; 57 had some form of treatment or discharged wastes to sanitary sewers. Of these, 21 were satisfactory and 36 were not. There appeared to be a continuing need for more action to obtain improvement of waste disposal facilities of milk plants and canneries.

Maps or drawings totalling 240 were completed in the following categories: watersheds - 12, surveys - 99, projects - 18, graphs or diagrams - 111. Card indices of analyses reports of stream samples were kept up to date.

Water Works and Sewage Works Operators' Courses

The first water works operators' school of the Commission was held between December 5 and 9, at the OWRC laboratory. Eighty-nine operators from all over Ontario attended the school. Lectures, with two exceptions, were given by members of the staff. This was the first of a three-course program of lectures for operators in this field. The next in this series was to be given in 1961.

The first sewage works operators' course of the Commission was scheduled for the spring of 1961, also at the laboratory.

Approval of Plans of Water and Sewage Works

The checking of plans for all water and sewage works projects gave the following summary and itemized list of the certificates issued to each municipality during 1960:

<u>Water Works</u>	<u>Estimated Cost</u>
Extensions to existing systems	\$20,804,807.54
Purification and water supply.	\$ 7,313,938.52
New systems.	<u>\$ 1,773,331.69</u>
TOTAL	\$29,892,077.75
<hr/>	
<u>Sewage Works</u>	
Extensions to existing systems	\$68,007,024.78
Treatment works.	\$11,130,766.21
New sewerage systems	<u>\$ 2,007,773.84</u>
TOTAL	<u>\$81,145,564.83</u>

The total number of applications favorably reported upon in the water works and sewage works fields for the year 1960 was

1,695 and involved an estimated expenditure of \$111,037,642, compared with 1,975 approvals and an estimated expenditure of \$115,726,003 in 1959.

Certificates Issued Re Water Works for the Year 1960

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
xActon	1		*150,000.00	
Ajax (Duffin's Creek Estates Ltd.)	1	105,727.00		
Alfred	3	1,572.30	3,850.00	
Alliston	2	31,730.00		
Arnprior	1	12,159.40		
Atikokan Twp.	3	126,580.00		
Aurora (Choice Cut- up Chicken)	1	4,820.00		
(Kelmar Constr.Co.)	1	4,030.00		
Aylmer	2	6,250.45		
Balmerton I.D.	1	2,623.56		
Barrie	5	25,327.77		
Bath	1	37,895.00		
Beamsville (Mr. Alvin Jackson)	1	4,000.00		
Beaverton	1	4,646.00		
xBeaverton	1	10,000.00		
Belleville	10	139,874.06	162,600.00	
xBertie Twp.	2		564,500.00	
Bertie Twp.	5	183,240.37		
Blenheim	1	1,683.50		
xBlind River	1		31,500.00	
Blind River	1	43,105.04		
Bolton	1	6,572.24		
Bowmanville	1	2,700.00		
Bradford	1		85,000.00	
xBrampton	1		*508,000.00	
xBrampton	2		257,000.00	
Brampton	3	119,526.00		
Brampton (Peel Village Developments Ltd., Toronto)	1	160,003.00		
xBrantford Twp.	1	*205,000.00		
Brantford	3	82,324.55	500,000.00	
Brighton	1		6,000.00	
Brockville	5	72,505.39		
Brockville (Calanco Lands Ltd.)	1	22,013.20		

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Burlington	7	103,205.59		
<u>Burlington (Verhoven Construction Ltd.)</u>	1	89,885.00		
(Green Forest Hill Survey)	1	24,258.44		
xCache Bay	1			*125,290.00
xCaledon East	1			88,000.00
xCampbellford	1		135,000.00	
xCannington	1		21,100.00	
Cardinal	2	22,850.00		
<u>Charlotteville Twp.</u>				
(Mr. W.W. Bowen, Turkey Point)	1	3,169.00		
Chatham	4	7,103.00		
<u>Chatham</u>				
(Indiancrest Ltd.)	1	21,630.00		
Chelmsford	1	5,775.00		
xChester ville	2	1,311.65		294,370.00
<u>Chinguacousy Twp.</u>				
(Bramalea Consolidated Developments Ltd.)	1	42,350.00		
Clarke Twp.				
(P. V. of Orono)	1		6,596.06	
Clinton	3	9,498.50		
Coniston	1	8,983.42		
xCookstown P.V.	1			*125,042.00
<u>Copper Cliff (Int. Nickel Co. of Canada)</u>	1		1,140,000.00	
Cornwall	7	69,318.21		
Cornwall Twp.	1	4,902.00		
Crowland Twp.	6	41,172.42		
Deep River	1		206,900.00	
Delhi E. (Mr. W.E. Adams, Simcoe)	1	4,671.07		
<u>Dorchester N. Twp.</u>				
(Craftstyle Homes Ltd.)	1	36,250.00		
Dresden	1	4,000.00		
Dryden	1	25,185.20		
xDundalk	1		106,925.00	
Dundas	3	64,690.48		
Durham	1	3,300.00		

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
xEganville	1			*137,183.00
<u>Eilber Twp. (Unorg.</u>				
Northern Ontario Pipe				
Line Crown Corp.,				
Ottawa)	1		90,420.00	
xElmvale	1		64,000.00	
xEspanola	1			*642,912.37
Etobicoke Twp.	42	1,056,045.84		
Exeter	5	20,727.02	74,015.00	
xFauquier Twp.	1			*76,910.00
xFenelon Falls	1			299,781.42
Fergus	1	26,040.00		
xFerris West Twp.	1	68,764.25		
(Marshall Park				
Development Ltd.)	1	6,047.28		
(Mr. S. Herman,				
North Bay)	1	59,025.24		
Forest	1	1,925.00		
Fort Erie	2	5,441.30		
xGalt	2	54,283.19		
Galt	7	269,069.96		
Gananoque	1	12,000.00		
Georgetown	1		42,000.00	
<u>Georgetown</u>				
(Mr. R. Lane,				
Georgetown)	1	25,000.00		
Glackmeyer Twp.	1	19,581.88		
xGoderich	1			*833,500.00
<u>Goderich (Dept.</u>				
of Public Works)	1		118,565.00	
Gosfield N. Twp.	1	30,736.00		
xGosfield S. Twp.	2	151,757.00		
Gosfield S. Twp.	2	73,928.00		
Grantham Twp.	3	64,979.00		
<u>Grimsby (Mr. R.</u>				
Sexsmith, Grimsby)	1	1,700.00		
(Glenwood Enterprises				
(Niagara) Ltd.,				
St. Catharines)	1	10,394.28		
Grimsby N. Twp.	4	50,932.44		

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
<u>Grimsby N. Twp.</u>				
(Mr. Percy Crapper)	1	8,050.00		
(Hall-Ogilvie Ltd., Grimsby & Dr. D.K. McNab, St. Catharines)	1	35,212.00		
Guelph	1		19,300.00	
Gwillimbury E. Twp.	2	7,344.80		
<u>Gwillimbury N. Twp.</u>				
(Balfour Beach Ass'n, Toronto)	1	36,680.00		
Hamilton	20	567,525.00		
xHanover	1		*45,000.00	
<u>Hawkesbury</u>				
(Realty & Dev. Co. Ltd.)	1	5,800.00		
<u>Hawkesbury W. Twp.</u>				
(Mr. Chartrand, Hawkesbury)	1	127,927.00		
<u>Hay Twp. (Messrs.</u>				
Jeffrey & Mernouage, Zurich)	1		1,840.00	
Hespeler	2	19,710.00		
Humberstone Twp.	1	7,746.69		
<u>Innisfil Twp.</u>				
(Mr. Burton, Stroud)	1	2,324.00		
(Todd-Bowness Dev. Co. Ltd.)	1		33,282.00	
Kapuskasing	2	18,600.00		
Kenora (and C.M.H.C.)	1	42,378.28		
Kincardine	1	7,000.00		
xKing Twp.	2			*397,700.00
King Twp.	1	37,000.00		
Kingston	5	114,772.56		
Kingsville	1	4,205.00		
Kitchener	1	168,353.00		
Korah Twp.	2	50,450.00		
<u>Lanark (Travellers</u>				
Insurance Co., Ottawa)	1		48,011.00	

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Leamington	4	18,684.95		
Leaside	2	158,600.00		
Listowel	1	15,500.00		
<u>Listowel</u>				
(M. & H. Homes Ltd)	1	4,760.00		
London	3	184,105.95	123,286.00	
London Twp.	3	147,000.00		
<u>London Twp.</u>				
(Roy James Const.Co.)	1	26,316.43		
(Ocean Devel't Ltd.)	1	19,921.36		
(Mr. H. Jonkhans)	1	4,400.00		
(Evancraft Ltd.)	2	13,000.00		
(Mr. Donald Crich)	1	2,400.00		
(Bernardo-Hoffman)	1	7,630.00		
(Upper Thames Dev. Ltd.)	1	62,490.00		
(Riverside Park Ltd.)	1	64,710.00		
Madoc	1	4,200.00		
<u>Markham</u>				
(Marland Holdings Ltd.)	1	27,527.00		
Markham Twp.	1	64,900.00		
<u>Markham Twp.</u>				
(Kilimanjaro Holdings Ltd.)	1	6,217.00		
(Schickendanz Dev. Ltd.)	1	35,228.00		
(Steel Valley Acres Ltd.)	1	13,850.00		
(Don River Hgts. Ltd.)	1	12,870.00		
xMarmora	3			176,527.35
Mattawa	3	18,675.60		
Medonte Twp.	2			37,595.32
xMersea Twp.	1	25,430.00		
Mersea Twp.	3	21,440.00		
<u>Mersea Twp.</u>				
(Mr. M. Mastronardi)	1	4,150.00		
(Dr. E. K. Lyon)	1	20,108.00		
Milton	2	5,276.10		

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
<u>Milton</u>				
(Mrs. J.M.Henderson, Islington	1	4,050.00		
xMitchell	1		57,295.00	
Mount Forest	1	2,919.74		
Napanee	1		295,000.00	
Nepean Twp.	3	1,050,837.40		
<u>Nepean Twp.</u>				
(T.F.S.Realty Co.)	1	104,115.00		
(Valley Stream Dev. Ltd.)	1	76,715.00		
(Lynham Realty Co.)	1	173,773.00		
xNewcastle	1			170,350.00
Niagara Twp.	1	49,358.76		
Niagara Falls	3	113,000.00		
Nipigon Twp.	1	15,810.00		
<u>Nissouri E. Twp.</u>				
(Mr. W.B.Clipperton, Lakeside)	1	3,206.06		
(Mr. Allan Noad, Thamesford)			6,103.00	
<u>North Bay</u>				
(Pinewood Village Ltd.)	1	27,670.00		
Oakville	4	149,999.25	226,500.00	
Ops Twp.	1			*83,843.75
Orillia	1	23,281.93		
Orillia & Orillia Twp.	1	4,742.71		
Orillia Twp.	5	82,302.92		
<u>Osgoode Twp.</u>				
(Mr. H. Barnhart)	1			412,450.00
Oshawa	7	525,888.25	350,000.00	
Ottawa	48	2,799,981.50	318,000.00	
<u>Ottawa</u>				
(Leopold Sipolins, Rockcliffe Park)	1	5,292.00		
Owen Sound	8	112,573.22		
Oxford East Twp.	1	58,116.00		
Paris	1	15,091.68		
xParkhill	1		118,000.00	

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Parry Sound	1	7,300.00		
Pembroke	2	4,345.00	130,000.00	
Peterborough	7	69,328.00	70,690.00	
Petrolia	2	8,420.00		
Pickering Twp.	1	93,000.00		
<u>Pickering Twp.</u>				
(Resources Land Co-op. Corp.)	2		974,300.00	
(McIntosh Investments Ltd. Scarborough)	1	37,470.00		
Plantagenet N. Twp.	2	5,800.00	10,000.00	
<u>Plantagenet N. Twp.</u>				
(P.V. of Wendover)	1			30,000.00
xPlayfair Twp.	1			*33,445.00
Port Arthur	2	105,370.00		
<u>Port Arthur</u>				
(Edgewater Land Dev. (Lakehead) Ltd.)	1	19,929.00		
(Headway Builders Ltd.)	1	2,525.00		
Port Credit	1		193,000.00	
Port Hope	4	49,680.00		
Port McNicoll	2	32,149.00	5,105.46	
xPreston	1	66,000.00		
Preston	1	11,915.00		
<u>Puslinch Twp.</u>				
(Mr. P.L. Pagani, Guelph)	1			32,352.60
xRatter and Dunnet Twps.	1			*58,168.00
xRatter and Dunnet Twps.	1			10,200.00 (part only)
Ridgetown	2	24,488.54		
Rockcliffe Park	1	15,138.24		
xRockland	1	112,000.00		
St. Thomas	4	101,945.19	44,000.00	
xSaltfleet Twp.	1	*278,626.00		
Saltfleet Twp.	2	47,014.96		
Sandwich E. Twp.	3	27,713.00		
Sandwich S. Twp.	1	28,499.00		
Sandwich W. Twp.	6	73,952.00		

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Sarnia	9	169,440.00		
Sarnia Twp.	1	6,560.00		
xSault Ste. Marie	1	115,000.00		
Sault Ste. Marie	1	14,600.00		
Scarborough Twp.	35	577,198.18		
<u>Smiths Falls</u>				
(Andrews & Co.				
(Cornwall) Ltd.)	1	7,165.00		
Sombra Twp.	1		6,500.00	
Southwold Twp.	2	38,950.00		
Stamford Twp.	4	30,220.92		
<u>Stanley Twp.</u>				
(Mr. R. Vodden,				
Clinton)	1	3,185.00		
(Messrs. Westlake				
and Talbot)	1			2,150.00
<u>Stoney Creek</u>				
(Spebro Dev. Co.Ltd.,				
Hamilton)	1	13,907.00		
Stratford	2	28,531.00		
Strathroy	1	1,162.00		
<u>Streetsville</u>				
(Credholme Dev.Ltd.,				
Toronto)	2	47,254.14		
(Mr. W.J. Whaley,				
Cooksville)	1	8,030.00		
Sturgeon Falls	1	9,952.10		
Sudbury	5	345,578.38		
Swansea	1	35,200.00		
xTara	1			*8,991.00
Tarentorus Twp.	3	78,005.00		
Tay Twp.	1	1,009.00		
xThedford	2	7,400.00		173,735.00
Thorold Twp.	2	6,076.85		
Tilbury N. Twp.	2	1,413.00	32,430.00	
Timmins	1	16,650.00		
<u>Tiverton</u> (Mr. J.				
McFayden's)	1		900.00	
Toronto	2	220,703.00		
Toronto Metro	8	2,670,000.00		
xToronto Twp.	1		*224,000.00	

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
Toronto Twp.	33	692,896.65	555,300.00	
<u>Toronto Twp.</u>				
(G.W. Pattison Const. Co., Cooksville)	1	18,558.00		
(Jaquar Home Builders Ltd.)	1	7,280.00		
(Interprovincial Factors Ltd.)	1	39,780.00		
(Idlewylde Devel'ts (Ont.)Ltd., Erindale)	2	55,718.25		
Trafalgar Twp.	9	288,934.00		
Trenton	4	74,576.03		
Tweed	1	1,900.00		
Uxbridge	1	958.33		
Vaughan Twp.	8	390,743.20	36,000.00	
<u>Vaughan Twp.</u>				
(Trans-Canada Pipe Lines Ltd., Toronto)	1			45,820.00
(Pinebury Developments Ltd., Toronto)	1	30,140.00		
Vespra Twp.	1	1,740.00		
Walkerton	1	5,900.00		
Waterloo	6	138,800.00		
Waterloo Twp.	3	15,576.25		
<u>Waterloo Twp.</u>				
(Messrs. L.A. Bechtel, Preston and Mr. H. Snider, Waterloo)	1	5,280.00		
Watford	1	5,400.00		
<u>Westminster Twp.</u>				
(H.A. Smith Const., London)	1	27,107.00		
(Fellner Constr.Ltd., London)	1	56,200.00		
Wheatley	1		1,125.00	
xWhitby Twp.	1		40,000.00	
Whitby Twp.	1	16,000.00		
<u>Whitby Twp. (Dwyer Heights (Oshawa)Home- builders Co-op. Ltd.)</u>	1		2,000.00	

Water Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Supply and Purification</u>	<u>New Systems</u>
		\$	\$	\$
(Meadowbrook Homebuilders Co-op. Ltd., Oshawa)	1	8,550.00		
Widdifield Twp.	1	253,150.00		
Windsor	3	110,227.18		
Woodstock	1	9,042.00		
<u>Woolwich Twp.</u> (Elmira Land Dev. Co. Ltd.)	1	17,800.00		
Yarmouth Twp.	2	23,900.00		
York Twp.	2	21,835.00		
York East Twp.	5	35,151.00		
York North Twp.	45	1,592,503.52		
TOTALS	702	20,804,807.54	7,313,938.52	1,773,331.69

x - OWRC Project

* - Preliminary approval only - included in total number of certificates, not included in total estimates.

Certificates Issued Re Sewage Works for the Year 1960

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
<u>Ajax</u> (Duffin's Creek Estates Ltd.)	1	280,845.00		
Alliston	1	9,600.00		
xAnderdon Twp.	1			199,168.00
Atikokan Twp.	1	51,690.00		
<u>Aurora</u> (Kelmar Construction Co.)	1	10,207.00		
xAylmer	1			*396,300.00
Aylmer	1	48,255.00		
Balmertown I.D.	1	1,764.02		
Barrie	8	59,962.93		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
<u>Beamsville</u> (Mr. Alvin Jackson, Beamsville)	1	3,000.00		
Belleville	5	104,305.87		
xBlenheim	1			*557,000.00
Blind River	2	61,941.34		
Bolton	1	6,426.00		
Bowmanville	3	67,300.00	343,500.00	
xBracebridge	1			*295,000.00
xBradford	1			213,000.00
xBrampton	1	184,700.00		
Brampton	5	279,012.28		
<u>Brampton</u> (Peel Village Developments Ltd.)	3	297,440.00		
Brantford	23	1,922,191.69		
<u>Brantford Twp.</u> (Burtch Industrial Farm)	1			72,000.00
Brockville	10	144,352.00		
<u>Brockville</u> (Calanco Lands Ltd.)	1	36,068.61		
xBurlington	2	353,050.00	303,600.00	
Burlington	12	576,413.99		
Burwash (Dept. Public Works, Ind. Farm Camp #2)	1			205,000.00
Caledonia	1	38,420.00		
Chatham	17	414,270.00		
<u>Chatham</u> (Indiancrest Ltd.)	1	78,150.00		
xChelmsford	1			193,250.00
<u>Chinguacousy Twp.</u> (Bramalea Consolidated Developments Ltd.)	1	188,765.61		
Chippawa	2	4,830.00		
Cobourg	2	16,346.00		
Collingwood	2	5,800.00	290,000.00	
xConiston	1	30,000.00		
xCornwall	1	175,000.00		
Cornwall	9	113,347.06		
xCrowland Twp.	1	1,378,240.00		
Crowland Twp.	4	15,964.80		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
Deep River	3	98,698.00		
Delhi (Mr. W.E. Adams, Simcoe)	1	2,765.84		
Dorchester S. Twp.	1	10,700.00		
Dryden	1	18,882.30		
xDundalk	1			*46,935.00
Dundas	3	142,810.00	*372,000.00	
Dunnville	1	1,555.00		
Elmira	1	4,500.00		
Ernestown Twp.	1	7,700.00		
xEspanola	1			*594,341.45
Etobicoke Twp.	70	4,018,828.70		
Exeter	1	4,700.00		
xFauquier Twp.				
(Moonbeam Village)	1			*70,600.00
Fergus	1	21,550.00		
Ferris West Twp.	1	4,905.61		
<u>Ferris West Twp.</u>				
(Mr. S.Herman, North Bay)	1	94,082.42		
(Marshall Park Dev. Ltd.)	1	9,327.65		
(Ralphway Const'n Co. Ltd.)	1	30,396.36		
Forest Hill Village	1	14,900.00		
Fort Erie	2	4,015.00		
xFort Frances	1			*969,000.00
xFort William	1	1,325,000.00		
Fort William	2	141,886.00		
Galt	4	139,057.18		
xGeorgetown	1	*52,000.00		
<u>Georgetown</u>				
(Mr. R. Lane)	1	20,000.00		
Glackmeyer Twp.	1	17,408.91		
Goderich	2	4,415.00		
<u>Goderich Twp.</u>				
(Dept. of Public Works)	1			191,000.00
Grantham Twp.	4	113,549.23		
Gravenhurst	2	114,870.00		
xGrimsby	1	150,000.00		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	No. of Certi- ficates	Extensions to Existing Systems	Treatment and Disposal	New Systems
		\$	\$	\$
Grimsby	1	*28,000.00		
<u>Grimsby</u> (Glenwood Enterprises (Niagara Ltd., St. Catharines) (Mr. R. Sexsmith)	1 1	12,845.25 2,500.00		
xGrimsby S. Twp.	1			*205,500.00
Guelph	6	306,838.45		
Guelph Twp.	1	12,400.00		
Gwillimbury E. Twp.	2	9,859.00		
 Hamilton	 14	 3,672,924.00		
<u>Hamilton</u> (W. Grisenthwaite Investments Ltd.)	 1	 80,233.00		
(Messrs. G. MacLanders, A. Kislak, A. Boxinbaum, H. Howard, A. Falcone, & H. Cohen)	1	10,400.00		
(W. Grisenthwaite Const. Co. Ltd.)	2	16,750.00		
(Sunshine Const. Co. Ltd.)	1	46,350.00		
(J. Bethune Const. Co.)	1	20,140.00		
(Elliott Const. Co.)	1	60,600.00		
(Robinson Const. Co.)	1	92,400.00		
(Mr. A. Sbrissa)	1	5,200.00		
(Grisenthwaite Developments Ltd.)	1	236,102.00		
(Abbotsford Properties (Hamilton) Ltd.)	1	12,750.00		
(Federal-Provincial Partnership)	1	64,100.00		
(Economy Home Builders)	1	32,800.00		
Harrow	1	9,744.00		
<u>Hawkesbury</u> (Hawkesbury Realty & Dev. Co. Ltd.)	 1	 25,257.75		
<u>Hawkesbury W. Twp.</u> (Mr. O.H. Chartrand)	 1	 73,309.00		
Hearst	1	21,995.00		
Hespeler	2	38,670.00		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
Ingersoll	1	42,480.00		
Kapuskasing	3	78,400.00		
Kenora (& C.M.H.C.)	1	138,486.12		
Kingston	11	192,784.08		
<u>Kingston</u> (Homestead Landholdings Ltd.)	1	2,400.00		
Kingsville	1	4,961.00		
Kitchener	4	261,713.10		
xKorah Twp.	1	205,000.00		
Korah Twp.	1	28,000.00		
Leamington	4	57,790.50		
Leaside	2	63,000.00		
Lindsay	2	160,000.00		
xListowel	3	61,660.00		
<u>Listowel</u> (M.&H. Homes Ltd.)	1	14,245.00		
London	24	287,209.59		
<u>London</u> (McClure Const'n Co)	1	61,500.00		
(Evancraft Ltd.)	1	18,500.00		
London Twp.	2	31,005.00		
<u>London Twp.</u> (Ocean Dev.Ltd., Toronto)	1	34,905.74		
(Roy James Const. Co.)	1	38,132.55		
(Sunrise Dev. Co.)	1			44,100.84
(Mr. H. Jonkhans)	1	9,300.00		
(W.Ontario Realty and Insurance Agencies Ltd.)	1	1,987.42		
(Orchard Park (London) Dev. Ltd.)	4	376,990.00	150,000.00	
(H.J. McClure Const.)	1	4,700.00		
(Evancraft Ltd.)	1	11,550.00		
(Mr. Donald Crich)	1	8,300.00		
(Riverside Park Ltd.)	1	191,810.00		
(Upper Thames Dev. Ltd.)	1	147,621.00		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
<u>Longlac I.D.</u>				
(Kimberly-Clark (Canada) Ltd.)	1	14,000.00		
<u>Louth Twp.</u>				
(Prudhomme's Hotel, Vineland)	1		39,600.00	
Madoc	2	5,500.00		
Manitouwadge I.D.	2	20,000.00	4,000.00	
Markham	1	7,500.00		
<u>Markham</u>				
(Marland Holdings Ltd.)	1	41,016.00		
xMarkham Village	1	191,000.00		
xMarkham Twp.	1	*349,125.00		
Markham Twp.	6	209,560.00		
<u>Markham Twp.</u>				
(Colmur Const. Ltd., Toronto)	1	82,500.00		
(Shickendanz Dev. Ltd.)	1	95,708.00		
(Steele Valley Acres Ltd.)	1	72,445.00		
(Kilimanjaro Holdings Ltd.)	1	24,263.00		
xMarmora	1			50,000.00
<u>Medora Twp.</u>				
(Clevelands House, Minett)	1		5,293.45	
Michipicoten Twp.	2	49,374.60		
<u>Milton</u>				
(Mrs. J.M. Henderson, Islington)	1	3,585.00		
(Oakview Dev., Willowdale)	1	4,830.00		
xMitchell	2			281,455.00
Mount Forest	1	1,800.00		
Napanee	1	84,264.75		
xNeelon & Garson Twps.	1			*523,947.02
xNeelon & Garson Twps.	1			367,000.00
xNepean Twp.	1	250,000.00	842,500.00	
Nepean Twp.	6	1,873,634.08		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
<u>Nepean Twp.</u>				
(Lynham Realty Co. Ltd., Ottawa)	1	191,705.00		
(Valleystream Dev. Ltd., Ottawa)	1	88,144.00		
(T.F.S. Lands Ltd., Ottawa)	1	106,053.00		
(Bellwood Park Dev. Co.)	1	13,280.00		
xNewmarket	2	*169,425.00	28,308.00	
xNewmarket (and Gwillimbury E. Twp.)	2	*146,800.00	*855,000.00	
Niagara Falls	6	104,850.00		
Nipigon Twp.	1	11,566.00		
North Bay	4	137,279.48		
<u>North Bay (Northgate Shopping Centre)</u>	1	33,000.00		
(Pinewood Village Ltd.)	1	31,500.00		
Oakville	4	62,720.00		
Ops Twp.	1			*193,675.50
Orillia	8	186,166.58		
Oshawa	14	359,347.93	94,000.00	
Ottawa	87	10,198,827.00	5,215,485.00	
xOwen Sound	1	70,400.00		
xOwen Sound	1	*684,380.00		
Owen Sound	4	109,244.34		
Palmerston	1	21,890.00		
Parry Sound	2	30,070.00		
xPembroke	1			100,000.00
Pembroke	2	46,313.72		
Peterborough	16	220,048.86	905,000.00	
xPetrolia	1			*272,000.00
<u>Pickering Twp.</u>				
(Resources Land Co-operative Corp.)	5	962,700.00	645,000.00	
(McIntosh Investments Ltd.)	1	133,345.00		
xPlayfair Twp.	1			*34,720.00

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	No. of Certi- ficates	Extensions to Existing Systems	Treatment and Disposal	New Systems
		\$	\$	\$
<u>Playfair Twp.</u>				
(U.S. Government - USAF Base at Ramore)	1		36,379.76	
xPoint Edward	2	48,500.00	239,000.00	
Port Arthur	11	872,217.30		
<u>Port Arthur</u>				
(Dept. P.Works, Ont.)	1	17,500.00		
(Edgewater Land Dev. (Lakehead) Ltd.)	1	35,627.00		
xPort Colborne	2	*630,600.00		
xPort Colborne	1		671,100.00	
Port Colborne	1	5,194.00		
Port Hope	2	12,405.31		
xPreston	1	3,850.00		
Preston	4	221,242.00		
<u>Rama Twp.</u>				
(Longford Mills Ont. Dept. P. Works)	1		43,000.00	
Richmond Hill	3	33,267.00		
Riverside	5	652,478.00		
St. Catharines	4	470,005.54		
St. Thomas	4	132,575.00		
Saltfleet Twp.	1	10,000.00		
Sandwich E. Twp.	1	35,712.00		
Sandwich W. Twp.	2	47,554.00		
Sarnia	11	1,573,090.00		
xSault Ste. Marie	2	440,000.00	1,275,000.00	
Sault Ste. Marie	7	210,112.78		
Scarborough Twp.	61	3,819,485.53		
xShelburne	1			*170,540.00
Simcoe	2	51,500.00		
<u>Smiths Falls</u>				
(Andrews & Co. (Cornwall) Ltd.)	1	5,185.00		
Southwold Twp.	1	21,725.00		
Stamford Twp.	3	101,312.96		
<u>Stoney Creek</u>				
(Spebro Dev. Co. Ltd., Hamilton)	1	33,800.00		
Stratford	8	141,807.00		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
Strathroy	1	29,180.00		
<u>Streetsville</u>				
(Credholme Dev. Ltd.,				
Toronto)	3	118,215.07		
(Mr. W.J. Whaley,				
Cooksville)	1	8,547.00		
Sturgeon Falls	1	13,076.77		
xSudbury	2	317,630.00		
Sudbury	7	1,116,828.28		
Swansea	3	78,914.96		
Teck Twp.	1	20,431.00		
Thornbury	1	15,522.10		
xThorold	1	*170,000.00		
Thorold Twp.	3	6,573.82		
xTimmins	1		22,000.00	
Timmins	2	56,868.00		
Toronto	51	5,236,850.00		
xToronto Metro	1	435,000.00		
Toronto Metro	11	4,169,710.00	1,200,000.00	
xToronto Twp.	3	*928,150.00	1,814,000.00	
Toronto Twp.	20	735,796.37		
<u>Toronto Twp.</u>				
(G.W. Pattison Const.				
Co., Cooksville)	1	30,008.00		
(Interprovincial				
Factors Ltd.)	1	147,718.00		
(Bob-Clare Invest-				
ments Ltd.)	2	7,066.00		
(Credit Valley Inv.,				
Port Credit)	1	30,244.00		
(Idlewylde Dev.(Ont.)				
Ltd., Erindale)	1	40,357.70		
(Interprovincial				
Factors Co. Ltd.)	1	27,225.00		
Trafalgar Twp.	6	484,610.95	330,000.00	
xTrenton	1	*223,000.00		
Trenton	1	2,070.00		
Tweed	1	1,000.00		
Uxbridge	1	2,564.00		
Vaughan Twp.	1	39,600.00		

Sewage Works Certificates (Cont.)

<u>Municipalities</u>	<u>No. of Certi- ficates</u>	<u>Extensions to Existing Systems</u>	<u>Treatment and Disposal</u>	<u>New Systems</u>
		\$	\$	\$
Wasaga Beach	1	2,250.00		
Waterloo	11	313,000.00		
Watford	1	3,800.00		
Westminster Twp.	2	66,307.62		
<u>Westminster Twp.</u>				
(H.A. Smith Const'n, London)	1	75,597.00		
(Mr. W.R. Kernohan, London)	1	113,506.40		
(Fellner Const'n Ltd., London)	2	159,860.00		
(Mr. G. Kent, Byron)	1	25,855.00		
Weston	1	16,400.00		
Whitby Twp.	1	9,925.00		
Warton	1	35,900.00		
Widdifield Twp.	3	108,408.00		
xWinchester	1			91,800.00
Windsor	3	1,693,982.00		
Woodstock	5	174,991.58		
Yarmouth	1	2,650.00		
York Twp.	3	110,830.00		
York East Twp.	6	78,087.00		
York North Twp.	89	5,822,922.00		
TOTALS	993	68,007,024.78	11,130,766.21	2,007,773.84

x - OWRC Project

* - Preliminary approval only - included in total number of certificates not included in total estimates.

WATER RESOURCES DIVISION

Ground Water Branch

The main work of the Branch in 1960 was divided, essentially, into three categories--ground water surveys conducted by the geologists and the field assistants; the licensing of drilling contractors, checking and assembling of records and field inspections handled by the inspectors and clerical staff; an observation well program, supervised chiefly by a field assistant.

Staff proved inadequate to deal efficiently with demands for ground water surveys and investigations, including county surveys. The licensing program was functioning normally but new regulations and legislation relating to water use should be studied for introduction as soon as possible. The observation well program required considerable enlargement to deal effectively with extensive water problems. If enlarged, this program could offer a forecasting service of ground water conditions which would help avoid critical periods of water shortage.

Ground Water Survey Program

The number of requests for ground water surveys and investigations continued to increase over previous years. The program may be divided into county surveys, minor investigations, detailed



On-the-job Inspection of Well-Drilling Operation

hydrogeological surveys and supervised well exploration projects financed by the Commission. This is shown graphically in Figure 1 at the end of this particular report.

County Surveys

Participation in water resources surveys in co-operation with other branches of the Commission continued in 1960. Field work was completed in Carleton, Haldimand, Peel and Wentworth counties and the District of Sudbury, and almost completed in Waterloo County. The field data were assembled and written up for Haldimand County but were only partly completed for the other counties at the end of the year.

Minor Investigations

Twenty-five minor investigations involved pumping tests, water quality, water supply and water level interference. Pumping tests were supervised at Ramore and Watford. Pollution or poor quality water was investigated in wells in Asphodel, Brock, Hope, Kingston and North Monaghan townships and the hamlet of Odessa. Investigations of a water supply nature were made for the townships of Calvert and Nottawasaga, the village of Alfred and the towns of Georgetown, Ingersoll, Simcoe and Timmins. Interference with the water levels in wells required investigations in the townships of Brantford, Glanford, London, Pickering and Westminster, the hamlet of Glanworth, the Town of Exeter and the City of Guelph. Most of the trouble was in domestic wells which were affected by either high capacity wells or the installation of sewer mains below the water table.

Hydrogeological Surveys

Ground-water surveys were undertaken for 18 municipalities which received reports with recommendations for locating new or additional water supplies. Upon receiving the reports, the following 14 municipalities took no further action during the year or acted independently of the Commission:

Townships of Medonte and Pelham, Improvement District of Beardmore, hamlets of Blackburn and South Woodslee, villages of Barry's Bay, Bradford, Eganville, Milton and New Hamburg, towns of Blenheim, Exeter and Hearst, and the City of Stratford. The Township of King, villages of Fenelon Falls and Wellington, and the Town of Vankleek Hill entered into agreements with the Commission to supervise test-drilling programs and are referred to below.

Test Drilling Projects

The well exploration program of 16 municipalities was supervised by the Branch in 1960. Twelve of these were completed during the year. Some of the projects were of short duration involving only a few days supervision; others ran into complications requiring frequent at-the-site instruction to the driller, council meetings and review of hydrological data. Here is a summary of the projects supervised by the Branch:

1. Projects continued from 1959:

Completed - Caledon East, Chesterville, Elmvale,
Port Burwell, Tara and Thedford.

Incomplete - Grand Bend, Val Albert.

2. Projects commenced in 1960:

Completed - Brooklin (Whitby Twp.), Fenelon Falls,
King Twp., Orono (Clarke Twp.), McGregor,
Wellington.

Incomplete - Vankleek Hill, Waterdown.

Licensing Program

Four hundred licenses to carry on the business of boring or drilling wells for water were issued in 1960. A total of 7,457 well records were filed by the drillers with the branch during the year. The three inspectors made 1,315 contacts with drilling contractors in the field, in the course of checking the locations and other information on 7,555 well records.

Minor revisions in the water well regulations were approved by the Commission in December, the most important change being the introduction of a separate license for boring contractors.

A graph relating to the licensing program is shown in Figure 2.

Observation Well Program

Twenty-seven observation wells were in operation at the end of December as part of the regular observation well program. Five wells were abandoned during the year when, for a variety of reasons, they became unsuitable for observation purposes. Automatic recorders were used in 11 wells, a steel tape in 14 wells and an airline in two wells for measuring water level variations.

In addition to the regular program water levels were measured in 15 wells in four areas where special ground water studies were in operation. One automatic recorder was used throughout the year in Brantford Township to assist in determining the effect of high capacity wells on domestic wells in the vicinity of the North Ridge golf course. Four wells were measured by tape in the Mount Hope area in anticipation of water level interference through quarry operations. Water levels in two private wells at Kitchener were measured by tape throughout the year preparatory to the use of a nearby municipal well. In the vicinity of the White Oak well field south of London, eight observation wells were being used, some since 1958, to study the effect of ground water withdrawal for municipal use on private wells in the area.

Special Events and Projects

Two members of the branch took part in a panel discussion at the University of Toronto on the use of geophysical methods in prospecting for water.

A portable model of the ground-water mural at the OWRC exhibit at the Canadian National Exhibition prepared in co-operation with the Information Office, was displayed on three occasions-- at the Ontario Water Well Association annual meeting in Peterborough in June, the annual meeting of the Soil Conservation Society of America at Guelph in August and the CBC's Country Calendar TV program in September.

Arrangements were made with two Junior farmers' organizations in East Zorra Township, Oxford County, to carry out a water resources survey during the fall. The field work was almost completed during the year, including a bacteriological sampling of the well waters, assisted by the Branch. A report was to be prepared on the project which was designed to be of maximum assistance to the junior farmers of the area through their actual participation in the project.

Surface Water Branch

During its second year, the Surface Water Branch experienced office centralization, modest but significant staff expansion and intensification of program. The directive to accelerate county water resources surveys dictated the emphasis placed on this phase of the program. These surveys are of a broad nature but concentrate on domestic and industrial water supply, waste water disposal and stream sanitation.

Miscellaneous projects pertaining to surface water resources were carried forward. These were related to the general fields of water use, hydrology and advisory development reports.

County Water Resources Surveys

These surveys are a procedure for assessing the water resources of the province for the present and future and are in keeping with the prime objective of ensuring adequate water supplies for all purposes. While co-ordination of these surveys rests with the Water Resources Division, comprehensive coverage is achieved through the participation of personnel from the divisions of Sanitary Engineering, Laboratories and Research, and Water Resources, and contributions specific to their training and skills.

From surveys initiated in 1959, field investigations and reports were carried forward for the counties of Welland and Haldimand. Five new surveys were commenced and virtually completed during the year. The counties or districts studied were Carleton, Peel, Waterloo, Wentworth and Sudbury. The associated reports were in various stages of completion at the year-end.

The field participation of staff assigned to this branch for these surveys is shown in the table below. The numbers of days in the field and samples secured were 273 and 1,260, respectively.

Branch Field Activities in County Surveys

<u>County of District</u>	<u>Days in Field</u>	<u>Number of Water and Wastewater Samples Taken</u>
Haldimand (a)	8	50
Carleton	81	361
Peel	14	- (b)
Waterloo	21	33 (b)
Wentworth	69	317
Sudbury	80	494
Total	273	1,260

- (a) Continued from 1959
 (b) Principal sampling by others

Development Reports

An advisory report of a preliminary nature on the development of sewage works for Kingston Township was prepared at the request of the municipality. In this way, guidance was given to the municipality to help it formulate a progressive development program and to stimulate co-operative area action.

Hydrologic Data

Records of a hydrologic nature are accumulated for reference purposes. Liaison and co-operation with other agencies active in this field were promoted.

Some pertinent procedures for statistical analysis of stream flows were reviewed. Low flow analysis for specific locations on the Grand and Thames rivers was initiated at the end of the year. The findings will be applicable to the assessment of the sanitary uses of the waters of these streams.

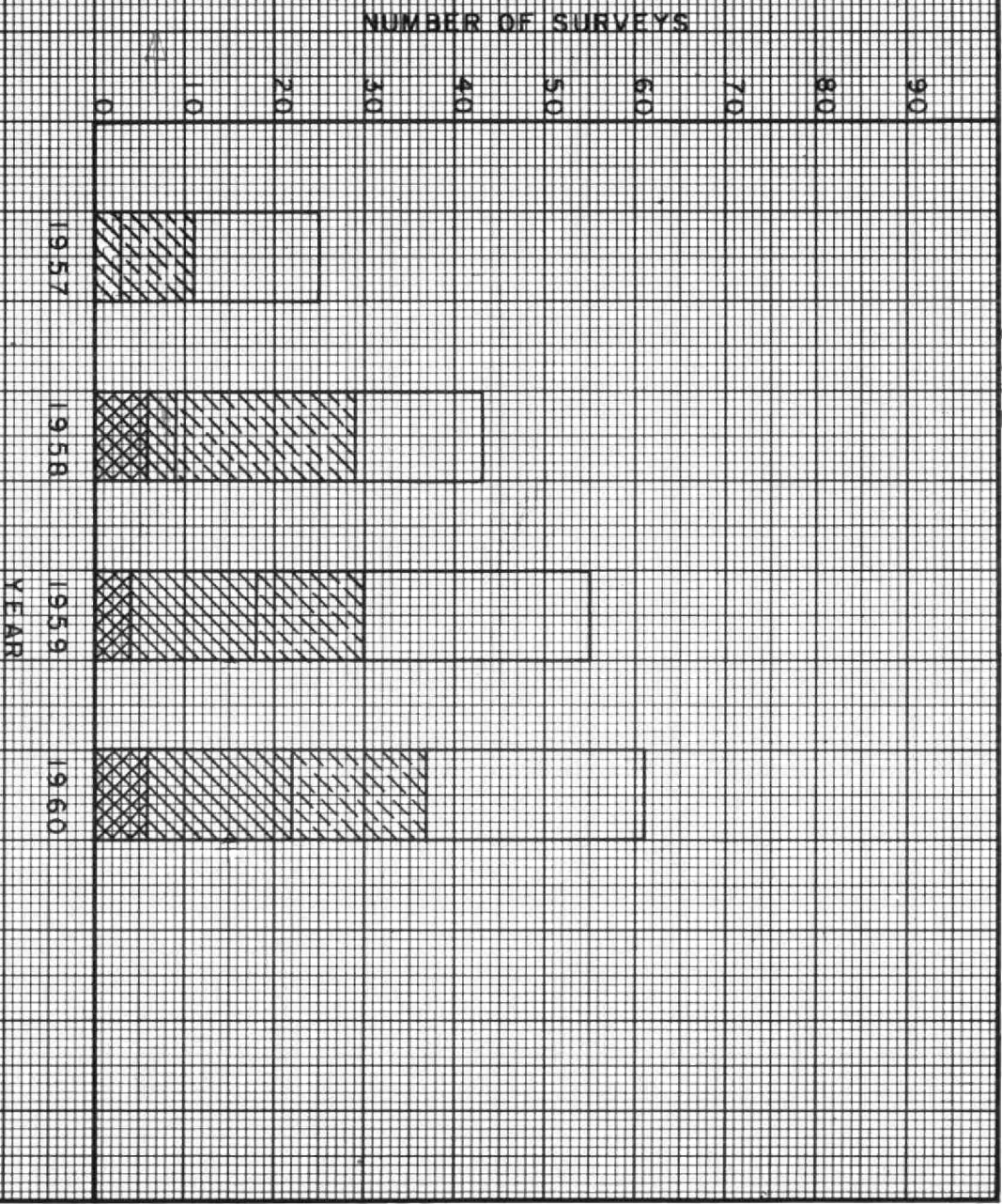


FIGURE 1 - GROUND WATER SURVEY PROGRAMME

LEGEND

Minor investigations - water shortages, contamination, pumping interference, etc.

Detailed hydrogeological survey - report submitted to municipality

Water exploration programme - Commission projects with test drilling, well construction and pumping test supervised by Ground Water Branch

County water resources surveys

Ground Water Branch

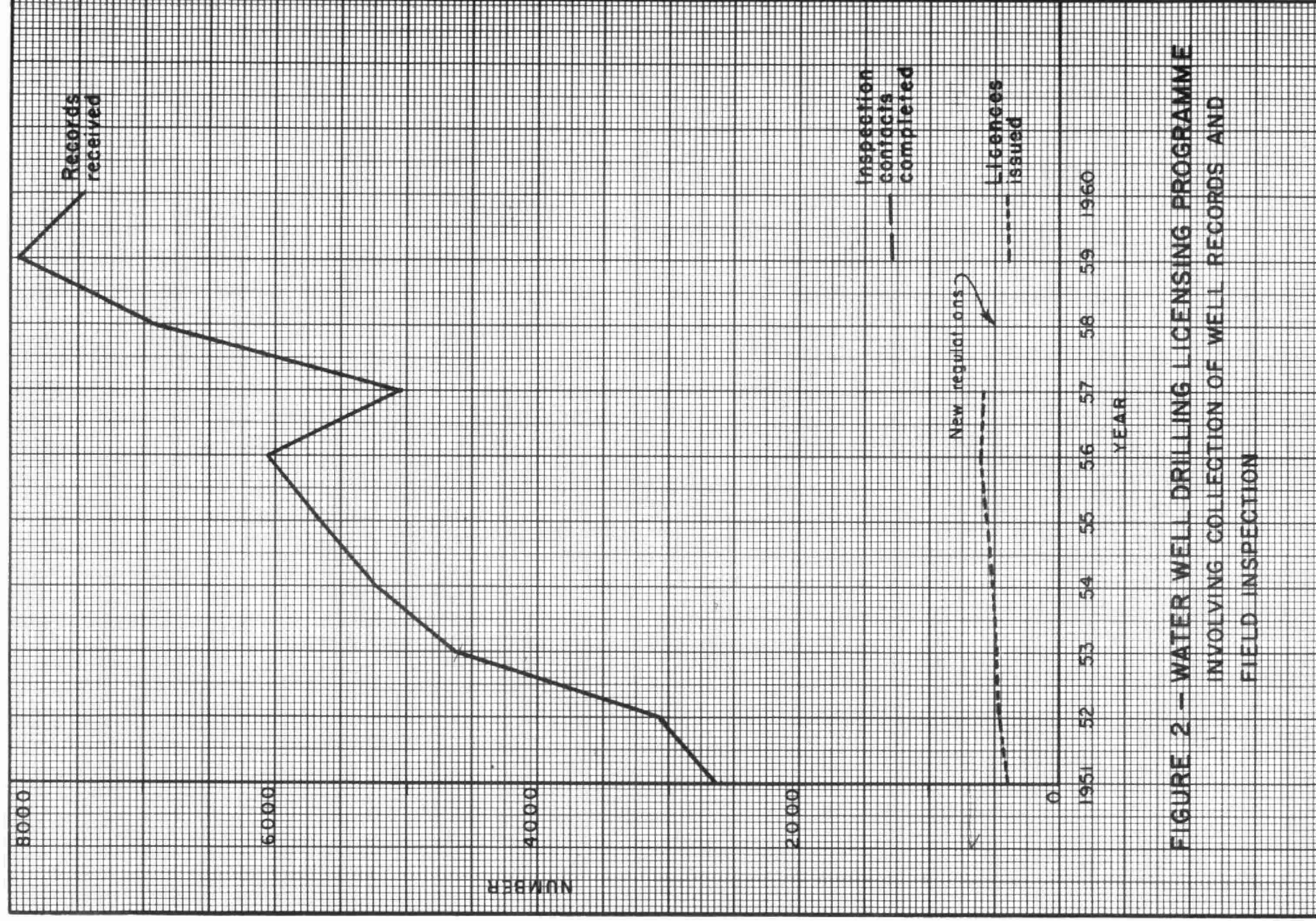


FIGURE 2 -- WATER WELL DRILLING LICENSING PROGRAMME
INVOLVING COLLECTION OF WELL RECORDS AND
FIELD INSPECTION



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